FEBRUARY 1, 1954

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

CLARENCE B. RANDALL—*Chairman, Commission on Foreign Economic Policy*

Freer Trade

"... Strength of our domestic economy requires . . . the maintenance of a broad free market for goods and services"

See page 55

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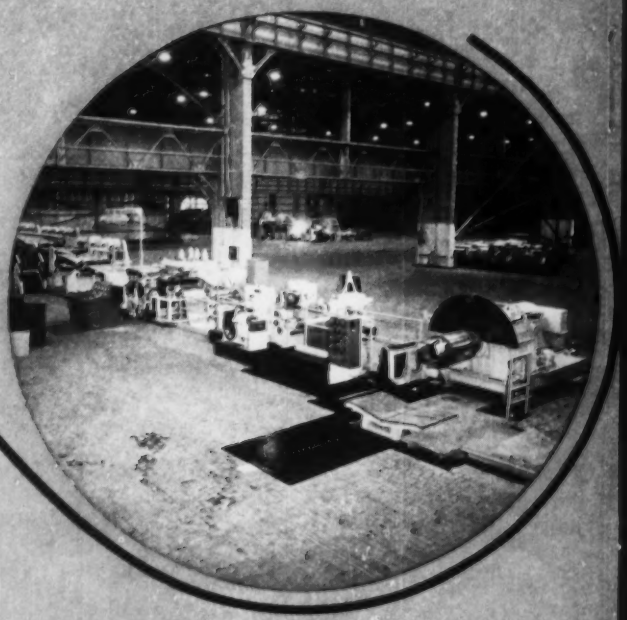
TIN SHEARING LINE . . . Receives coils (up to 36,000 pounds) from Temper Mill. Material is side trimmed, sheared to specified lengths and classified into primes and seconds . . . all automatically. This Aetna-built line in the Fairless Works of U. S. Steel has a rated speed of 1250 f.p.m. for regular tin plate gauges in sheet sizes up to 38" x 43".

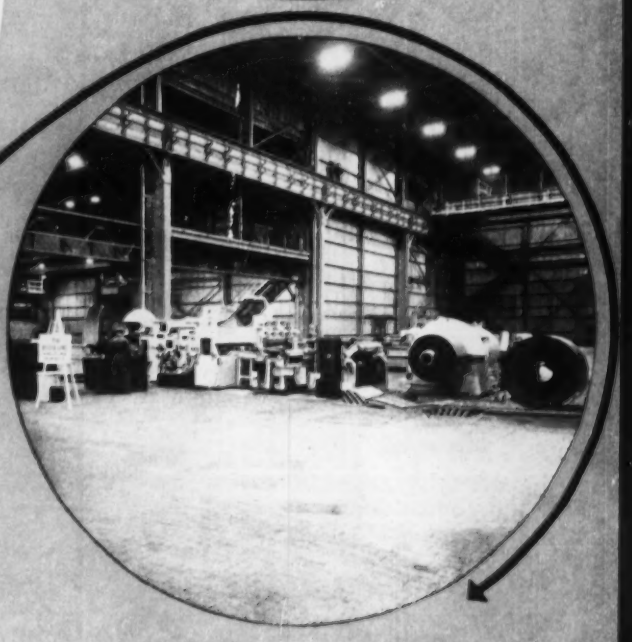
Tin Shearing Line built by Aetna-Standard for Fairless Works, U. S. Steel.



Flat-Rolled Equipment

SHEARING AND CLASSIFYING · SCRUBBING AND DRYING · RECOILING · SLITTING AND SIDE TRIMMING · ROLLER LEVELERS · PAY-OFF AND TENSION REELS · SIDE TRIM AND RECOIL · SIDE TRIM AND SHEAR · TIN PLATE, SIDE TRIM AND SHEAR · CLASSIFYING

SIDE TRIMMING AND RECOILING LINE . . . This 40" line prepares coils for the Electrolytic Tinning Line of Fairless Works, U. S. Steel. The strip (in coil form) is side trimmed at speeds up to 4000 f.p.m. The line operates under tension with ends of coils joined by seam welding. Close tolerance and high speeds are essential to the successful operation of the line.



40" Side Trimming and Recoiling Line in Fairless Works of U. S. Steel.

THE AETNA-STANDARD ENGINEERING COMPANY · PITTSBURGH, PA.

Aetna-Standard

PLANTS IN WARREN, OHIO · ELLWOOD CITY, PENNSYLVANIA

GOOD EQUIPMENT BRINGS DOWN PRODUCTION COSTS

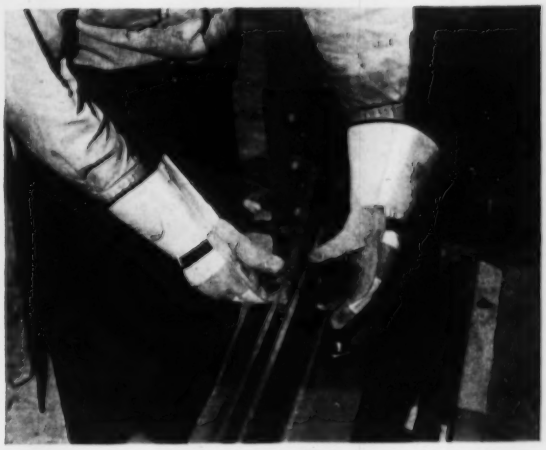
SUBSIDIARY and ASSOCIATED COMPANIES

Head Wrightson Machine Company, Ltd., Middlesbrough, England — Great Britain, Finland, Sweden, Norway, Denmark, Union of South Africa, Northern and Southern Rhodesia.
Aetna-Standard Engineering Company, Ltd., Toronto, Ontario, Canada.
M. Castellvi, Inc., New York, N. Y. — Mexico, Central and South America.
Societe de Constructions de Montbard, Paris, France — France, Belgium, Holland, Luxembourg, Switzerland.
Demag Aktiengesellschaft, Duisburg, Germany — Germany, Austria, Yugoslavia, Greece, Turkey, Egypt.
Compagnia Italiana Forme Acciaio, Milano, Italy — Italy.
Aetna-Japan Company, Ltd., Tokyo, Japan — Japan.
Hale & Kullgren, Inc., Akron, Ohio — Representative for the Rubber Industry.
Standard Engineering Company, Ellwood City, Pa.
Trans-World Traders, Pittsburgh, Pa.

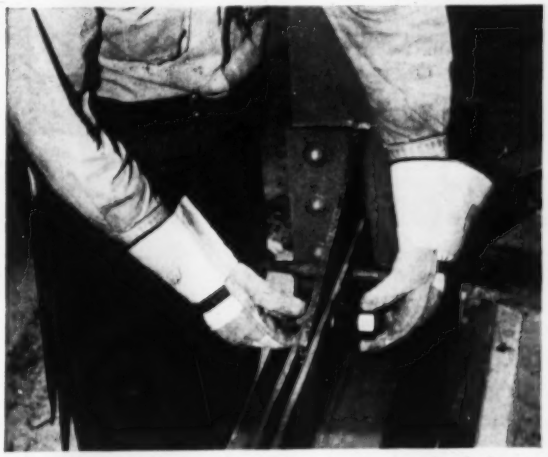
Designers and Builders to the Ferrous, Non-Ferrous, Leather, Rubber, and Plastic Industries

Here's the quick and easy way to join structural members

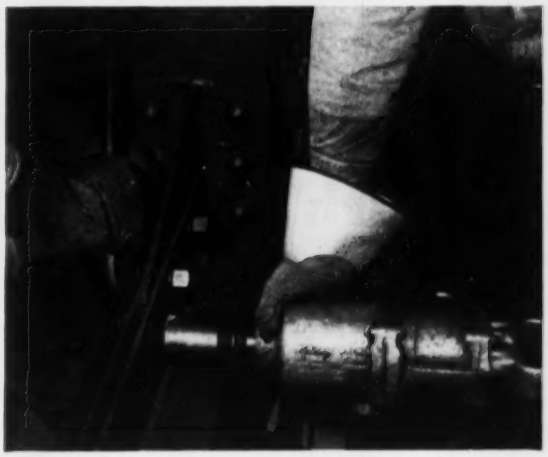
1 The holes are aligned, using one or more drift pins. Then the worker inserts the bolt, placing hardened washer under bolt head.



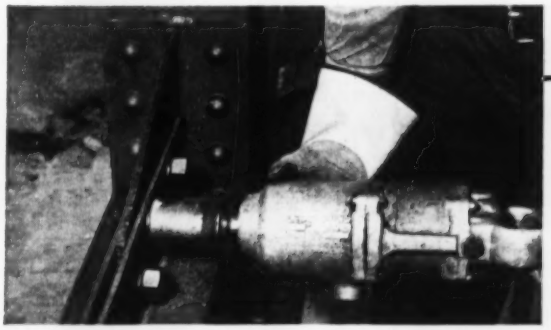
2 Head of bolt is held lightly with fingers as second hardened washer is slipped into place over threaded portion of the bolt.



3 Hexagonal nut is run up on the bolt. At each joint, the initial bolt is tightened sufficiently to keep holes in alignment. Then pins are replaced with bolts.



4 With bolt head held by hand wrench, nut is quickly torqued with pneumatic impact wrench. That's all there is to it! The whole operation takes less than the time to describe it. No wonder this time saving way of erecting steel with high strength bolts is growing more popular every day!



◀ *Alternative Method*—The Bethlehem High Strength Bolt may also be installed by one man. With this method, the nut is first drawn up as far as possible with the hand wrench. Then the impact wrench is used alone.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM HIGH-STRENGTH BOLTS

with TOCCO* Induction Heating

● Hardening—annealing—brazing—soldering—heating for forming or forging—if your products require any of these operations TOCCO can probably reduce you. unit costs too.

COSTS DOWN 69%—Mechanics Universal Joint Division of Borg-Warner reports a 69% savings in the hardening of stub ends for propeller shafts. TOCCO'S localized hardening minimizes distortion—does away with straightening operation formerly required. With conventional heating methods splines had to be ground back to tolerance because of run-out. TOCCO also eliminates this costly operation.

PRODUCTION UP 320%—Automatic TOCCO has upped production from 35 to 112 parts per hour—over three times as fast as conventional heating method. Shafts are of C-1137 Steel, are hardened to 47—54 R.C. to a depth of 0.040". Every part is the same—one or a million—because TOCCO'S automatic heating and quenching cycles eliminate all chance for human error.

Experienced TOCCO engineers are glad to survey your plant for similar cost-cutting possibilities—no obligation of course.

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TOCCO

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Please send copy of "Typical Results of TOCCO Induction Hardening.

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How to brush down finishing costs *automatically*

Power Brushing finishes both sides of these brass discs at a rate of 15,000 per machine per eight-hour day. It does a better, more uniform job many times faster than hand methods.

Parts are placed on spindles which rotate at 60 r.p.m. The table also turns at about one revolution in 25 seconds bringing the Osborn Economy Section Brushes into contact with each part in turn. Spindles stop rotating as they approach the loading station, where a mechanism lifts finished parts and air pressure blows them into a chute.

A similar automatic operation with Osborn Power Brushing may improve the quality and speed of *your* cleaning, finishing and deburring operations . . . whether you process large parts or small . . . made of metallic or non-metallic materials. Ask your nearby **O**sborn **B**rushing **A**nalyst to appraise *your* possibilities. Write to *The Osborn Manufacturing Company, Dept. G-15, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

FREE: New booklet on deburring with Osborn Power Brushing. Ask for your copy.

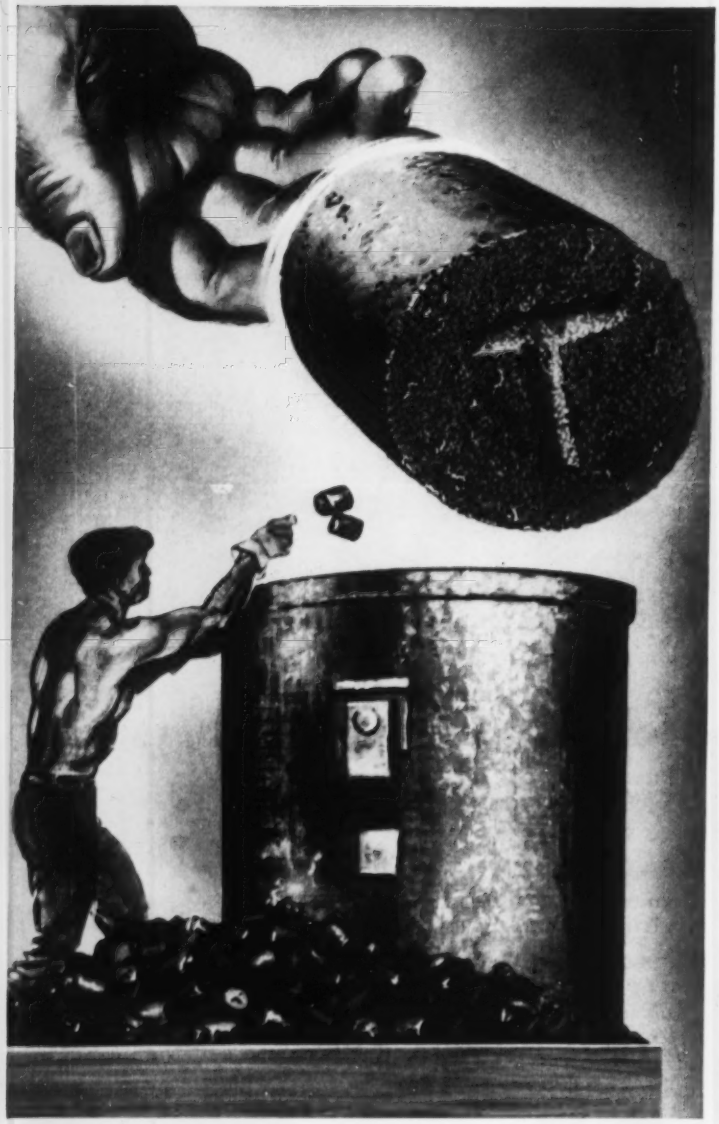
The finished part. Osborn Power Brushing removes feather burrs and blends surface junctures.

Osborn Brushes

OSBORN

OSBORN BRUSHING METHODS • POWER, MAINTENANCE AND PAINT BRUSHES • BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

about Silicon and Manganese briquettes



Makes alloy control easier... more accurate

TENNESSEE'S Ferrosilicon and Ferromanganese Briquettes contain exact quantities of ferrosilicon and ferromanganese, making it easy to control accurately the alloy content of cupola charges. No weighing is necessary. Just count 'em to suit the charge and toss 'em in.

TENNESSEE also produces Ferrosilicon and Ferromanganese in lump and crushed forms . . . Tenn-Sil additive for molding sand . . . low-phosphorus and malleable pig iron . . . coke . . . all keys to lower costs and improved products.

Mail the coupon for complete information on these products.

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This Week in Metalworking

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

Vol. 134 No. 5 February 1, 1954

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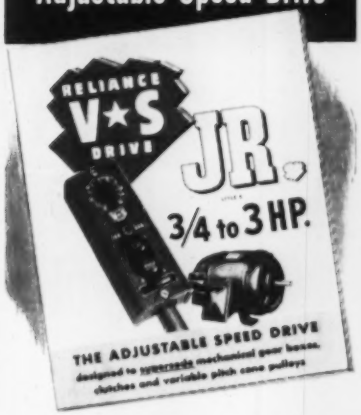
STEP UP PRODUCTION OF SMALL MACHINERY, TOO!
...with this All-Electric Adjustable-Speed Drive



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SAVE MONEY 10 WAYS!

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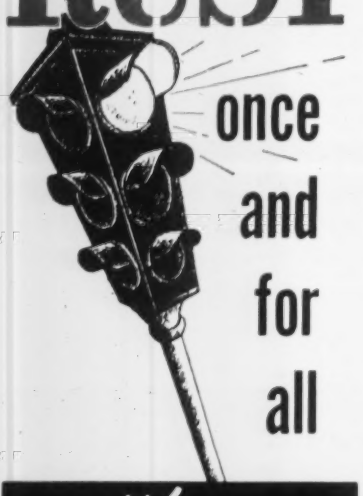

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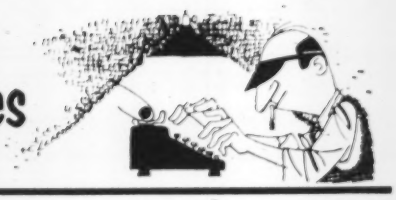
behind the scenes



Souped-Up Editor

Floyd Lawrence, Detroit editor of STEEL has been elected regional executive of the Detroit Region, Sports Car Club of America.

SCCA, they tell us, is the largest sports car group in the country, consisting of over 4000 members nationally. The Detroit Region which Lawrence heads numbers over 300 members, many of whom are cracker jack automotive engineers putting in their eight hours per for Ford, Chrysler, GM, etc.

Most notable activity of these grown-up hot-rodders is the licensing of competition drivers and sponsorship of national competition events for sports cars.

Lawrence is quick to admit that his supercharged and highly modified Mark II MG is ready for the racing circuit this year, so don't be too surprised if his "Mirrors of Motordom" column in some forthcoming issue is datelined "Twenty-fifth lap; still trying to catch that Jaguar."

When questioned on his specific plans regarding racing his souped-up MG Lawrence comments dourly, "My wife still holds the green flag." That, to us, is just another way of saying "He's had it."

At any rate, his background as an auto enthusiast will come to you in the pages of "Mirrors" enriched by his extensive contact with automotive experts. You can certainly expect to get more of those "ahead of the news" impression reports on American cars which have become so popular with you during the past year.

A Story Is Born

The other day we asked John Morgan, assistant managing editor, to give us an example of how a typical STEEL article is born and developed. As a for instance, he selected the eight-page Program for Management article of Sept. 7 on labor, a reprint of which was sitting on his desk.

"We started work on that about the first week in August," said John. "Interviews were set up in Washington with the Department of Labor, in Pittsburgh with the CIO steel workers, in Detroit with the CIO headquarters and in Cleveland with various labor experts and industrial relations experts.

"Altogether, 11 interviews were made, two books on labor relations read, about a dozen articles on labor in other publications studied in preparation for the writing job. The actual first draft was written in 15 hours. It took about 4 hours to gather charts, tables and other illustrative matter. Another 6 hours went in editing and rewriting parts of the first draft. It was then submitted to several of STEEL's editors for comment. There were many suggestions for improving the story. These were worked into the article in approximately 2 hours. The final draft was then discussed with a top-flight industrial relations consultant on Aug. 28. He suggested more changes which were incorporated that day, just before the article was sent to the printers.

"In the meantime, four days had been spent on preparing the art layouts. About half of the finished art went to the engravers on Aug. 27, the other half required changes and was held until Aug. 28. Proofs of type and artwork were ready by Aug. 31. They were then pasted into dummy layout. By 2 p.m. Sept. 1, all corrections had been made, and the article, in final form, had been proofread by four different editors.

"All in all, we gathered seven pounds of material to develop and publish an eight-page story weighing about one ounce."

Since then, John, you will be interested to know that the weight of that one-ouncer has made itself felt throughout the metalworking industry. In fact many hundreds of pounds of reprints of this article have been requested by readers across the country.

A Pointed Message

The Union, Brookfield, Mass., newspaper, we are told, has the following word for its readers:

"In case you find mistakes in this paper, please consider they were put there for a purpose. We publish something for everyone, and some folks are always looking for mistakes."

Shrdlu

(Metalworking Outlook—Page 37)

Galvanite* forms well . . .

. . . is resistance welded . . .

. . . and passes inspection . . .

SHARON Galvanite*

. . . and it begins from labor and cost-saving coil fed through portable leveler directly into press.

Another Leading T-V Parts Manufacturer Chooses Galvanite* Strip to Improve Product

Send for your copy of Sharon's New Galvanite* Handbook.

A large eastern manufacturer of television and radio parts has recently switched to Galvanite* after reading the results of comparative tests he had made at an independent testing laboratory.

Galvanite* is the special process zinc coated steel produced by Sharon which discourages rust so effectively that those who have compared Galvanite* with similar products have demanded such quantities that Sharon was forced to recently install a new 50,000 ton-per-year line.

Galvanite* in strip form enables this manufacturer to get maximum speed of production at the blanking station. This trend to produce directly from the coil is gathering momentum in progressive plants, because of the savings in both production and handling.

*Trade name copyrighted by the Sharon Steel Corporation

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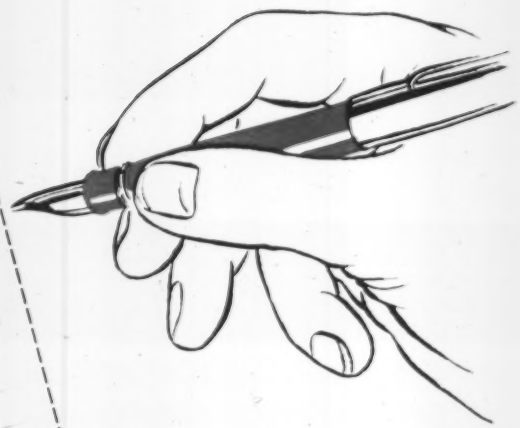

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If you're interested in better metal cleaning and surface preparation, if you're interested in important savings in cleaning chemicals, there's one sure and simple way to get both . . . put your pen to the coupon above!

Here's what happens when Detrex receives this go-signal from you. At your convenience, our local man will survey your present or proposed metal cleaning operations. It's done without fuss or fanfare . . . he knows his business and how to go about it without disrupting yours.

Shortly afterward, he'll be back with specific recommendations AND the benefits he guarantees if you follow them. Like thousands of other manufacturers, you'll find these recommendations make good sense in terms of cleaning quality. In most cases they'll result in substantial savings, too!

Why can Detrex guarantee these results? *Because Detrex manufactures both the equipment and chemicals for every type of metal cleaning . . . alkaline and emulsion washing, solvent degreasing, even cleaning by sound waves*.* It adds up to industry's most comprehensive metal cleaning service! It can't be matched anywhere.

*SONICLEAN PROCESS

Just send us the coupon above, or drop us a letter. We'll be glad to prove our point. DETREX CORPORATION, Box 501, Detroit 32, Michigan, Dept. 601

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DEGREASERS • DEGREASING SOLVENTS • WASHERS
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EQUIPMENT • PHOSPHATE COATING PROCESSES

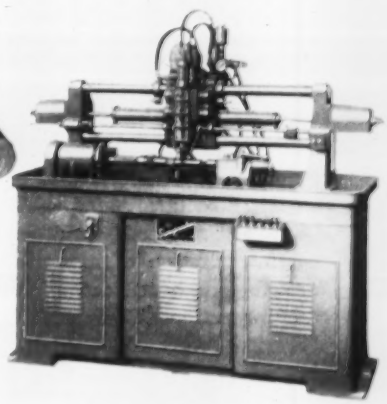
SUPERFINISH
MAKES THESE PARTS BETTER
. . . 5 WAYS!

You're looking at a group of parts that go into the Gisholt Fastermatic Automatic Turret Lathe. Super-smoothness of working surfaces of these parts is vital to the precision and long life of the machine. So all these parts are Superfinished—including overhead pilot bars, piston rods, hydraulic control valves, thrust collars, turret locating pins and rollers.

The benefits are many:

1. Superfinishing removes all chatter marks, grinder flats, "smear metal" and other surface irregularities.
2. It assures more nearly perfect geometrical forms. This means more uniform bearing surfaces. They therefore last far longer.
3. Superfinishing simplifies assembly because the surfaces are down to true "base metal"...and no break-in tolerances are required.
4. Superfinishing simplifies grinding and reduces spoilage.
5. The greater degree of smoothness makes the parts easier operating, reduces wear.

The net result of Superfinish here—as it can be in your case—is parts that perform better, last longer and cost far less in the long run. See how Superfinish can solve your problems of both wear and surface roughness. Get your copy of "Wear and Surface Finish," and complete textbook covering all phases of Superfinish.



Model 52-A General-Purpose Superfinisher

THE GISHOLT ROUND TABLE

represents the collective experience of specialists in machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

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TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

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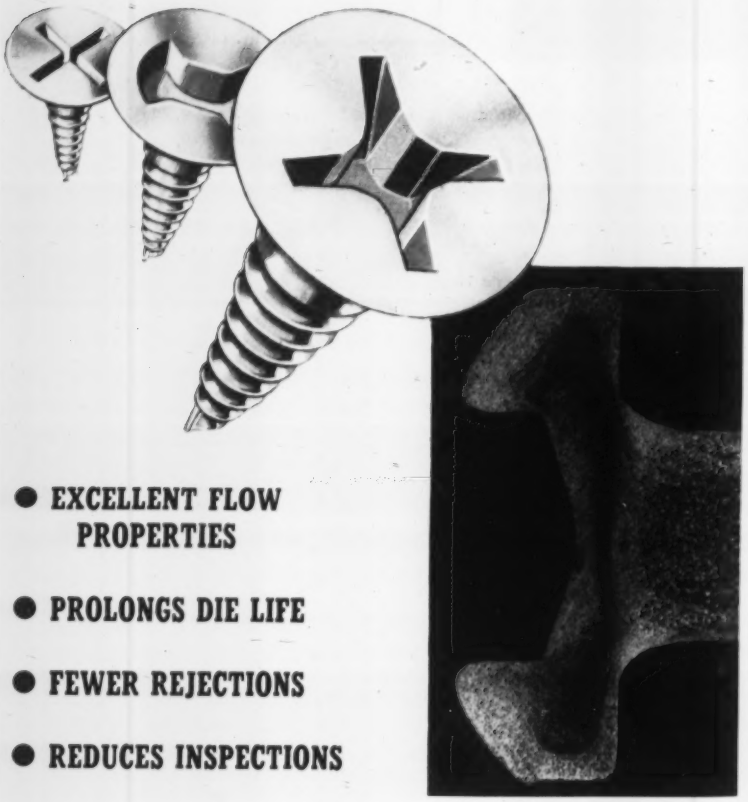

- EXCELLENT FLOW PROPERTIES
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The excellent grain flow properties of this superior cold heading wire assures the desired upsetting and die forming qualities you need for greater efficiency in the production of Phillips head, clutch head and cross-recessed head screws.

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LETTERS TO THE EDITORS

Compass Points the Way

Will you please send me a copy of the "Compass for Competition" (Jan. 4, p. 113). This was extremely well done and I would especially like to have a copy of this for my personal file.

L. W. Ingold
sales manager
Pittsburgh Forgings Co.
Coraopolis, Pa.

Please send me 10 copies of the "Compass for Competition."

John D. Judge
president
Tube Reducing Corp.
Wallington, N. J.

I have read and re-read your "Compass for Competition" and wish to compliment you on its composition.

I want everyone of my top people to have a copy. Would appreciate your sending me 12 copies.

J. R. Tranter
president
Tranter Mfg. Inc.
Lansing, Mich.

• *Being Sent.—ED.*

For More Facts and Figures

We have been receiving our copies of STEEL with a great deal of interest. Your Jan. 4, 1954 Metalworking Yearbook issue contains the "1954 Metalworking Facts & Figures" section (pp. 157-204), and we would like to have one reprint of those pages.

E. M. Bradley
Data Bureau
General Manufacturing Section
International General Electric Co.
Schenectady, N. Y.

• *Being Sent.—ED.*

Research Helps To Sell

We feel that your article "Marketing Research," No. 10 in STEEL's Program for Management (Dec. 7, p. 125), is a very good coverage of this subject. Would it be possible to obtain tear sheets of this article?

STEEL's Program for Management for 1953 has been a very helpful and interesting series, and we are anticipating the new series planned for 1954.

R. F. Fricker
market analyst
Sperry Products Inc.
Danbury, Conn.

Thanks for making sufficient copies of your article "Marketing Research" available to us for distribution to our company membership. Please accept my compliments on a very fine job. I am sure it will be of great interest to our company members.

William C. Gordon Jr.
executive director
American Marketing Association
Chicago

Please turn to p. 12

PRECISION three-dimensional service

...IN MASS PRODUCTION

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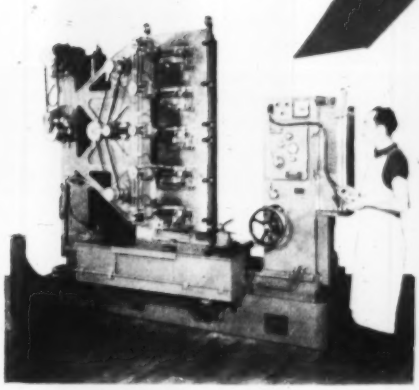
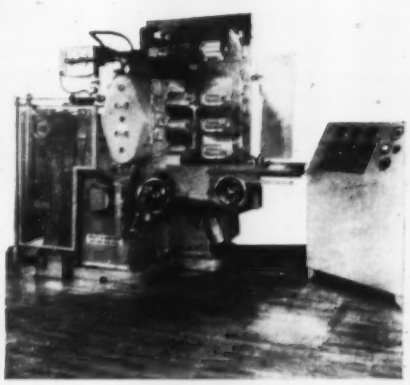
Engineered—Developed—Produced—Duplicated

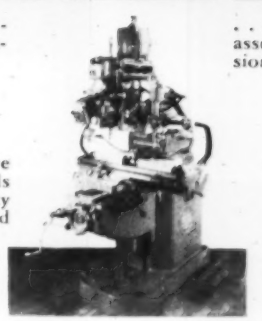
There's true craftsmanship—that *insures* precision—in all Summit-Roberts contour work. Control is rigid and standards high. For the jet engine program, for instance, tolerances in multiple-duplicated dies are held to .0005 of an inch. Summit-Roberts is one of the country's leading producers of turbine blade and bucket dies for precision forgings.

Summit-Roberts is *fully* equipped—and has a background of thirty-eight years in precision contour work, both in machining and cold hobbing. To put this experience to work in your plant, to insure continuous, trouble-free, high production—wire or write.





Batteries of four-spindle precision duplicators . . .



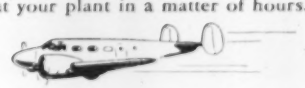
. . . plus batteries of three-spindle Kellers assure precise profiling and three-dimensional milling of multiple impressions.

Four super-sensitive Cincinnati Hydrotells assure ample capacity for development and special rush work.

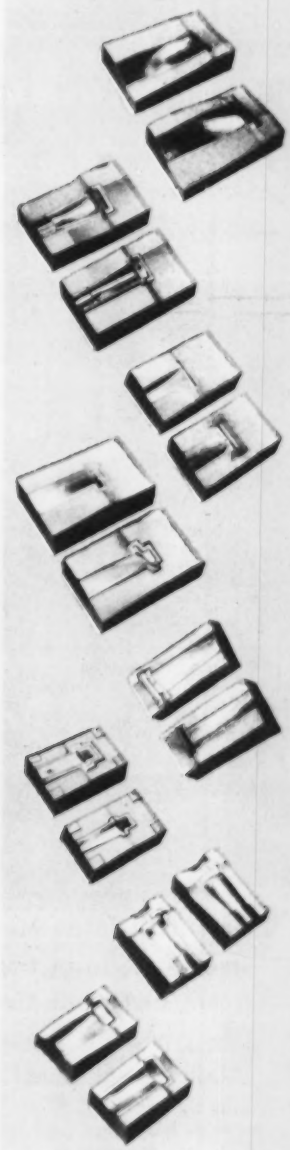
Our fully-equipped shop also includes a 3000-ton hobbing press.

Service...unusually fast...

Our private plane insures that we can be at your plant in a matter of hours.



ONE OR ONE THOUSAND—
WE CAN SUPPLY YOUR MONTHLY
PRECISION DIE REQUIREMENTS.



SUMMIT · ROBERTS PRODUCTS, Inc.

830 NEW YORK AVE. • TOLEDO, OHIO

Known for Craftsmanship Since 1915

Work-O-Matic® End-Loading Scoop for lift trucks.
Greater storage with compactly tiered Steel Boxes.
Work-O-Matic® Box in controlled dumping operation.
Select the money-saving units you need from
INDUSTRY'S BROADEST LINE OF
Material Handling Containers
Work-O-Matic® Multi-Duty Tray for long pieces. Collects, transfers, tiers and dumps.
Skid Platform . . . one of many types.
Typical Steel Skid Box.
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Work-O-Matic® Box with Production Positioning Stand.
Nesting and Hopper Front Steel Shop Boxes—two of many standard types.
Vu-O-Matic Rotary Parts Storage Stands.

A broad line is one thing. Far more important is the fact that Union Metal units introduce exclusive *new method* features responsible for huge cost savings in plant after plant. Get up-to-the-minute facts. Indicate the type units you are interested in and write to The Union Metal Manufacturing Company, Canton 5, Ohio.

*Patent No. 2,445,038. Other patents pending.

UNION METAL

Material Handling Equipment

LETTERS

Concluded from p. 10

Your Program for Management just completed in December has been most interesting and valuable. I was about to say which of the ten articles in the series was best, but I give up. All were very excellent.

Harold L. Morris
assistant chief engineer
Hall-Scott Motor Division
ACF-Brill Motors Co.
Berkeley, Calif.

I am much impressed by the caliber of the research that you did in developing the material for your article on marketing research.

Charles W. Smith
McKinsey & Co.
New York

Revised Guide Coming

About three or four years ago STEEL ran an article showing what different steel mills manufactured by product and size.

I would like to know if it is possible to obtain a copy of that article or whether in the near future you are going to run an article similar to the one mentioned.

Since freight charges are being absorbed by many steel mills, this article would be very useful to me and other buyers at this particular time.

S. R. Rushworth
purchasing agent
Oliver Corp.
Cleveland

• *You refer to "Guide for Steel Buyers" which* STEEL *published Jan. 15, 1951. That is now out of print. However, a new and revised edition, covering carbon, silicon and alloy steels, will be published with the July 12, 1954, issue of* STEEL.—*ED.*

Car Price Page Coming

Last year you had a very interesting page on automobile prices "1953 4-Door Sedans—What You Get for Your Money" (Feb. 23, p. 68). I assume you are going to get out a 1954 edition of these prices, and I am going to make a suggestion that I think would be of great help to your readers: Compile prices on small trucks put out by the various truck manufacturers. It is surprising to find out how often we want to get information on the size of a truck, or specifications on a truck or its prices.

A. C. Daman
president
Denver Equipment Co.
Denver

• *Thank you for your suggestion. We are, indeed, planning a price page on 1954 passenger cars similar to that of February, 1953. We'll see what can be done about a compilation of small truck specifications and prices.—ED.*

Good Question on Safety

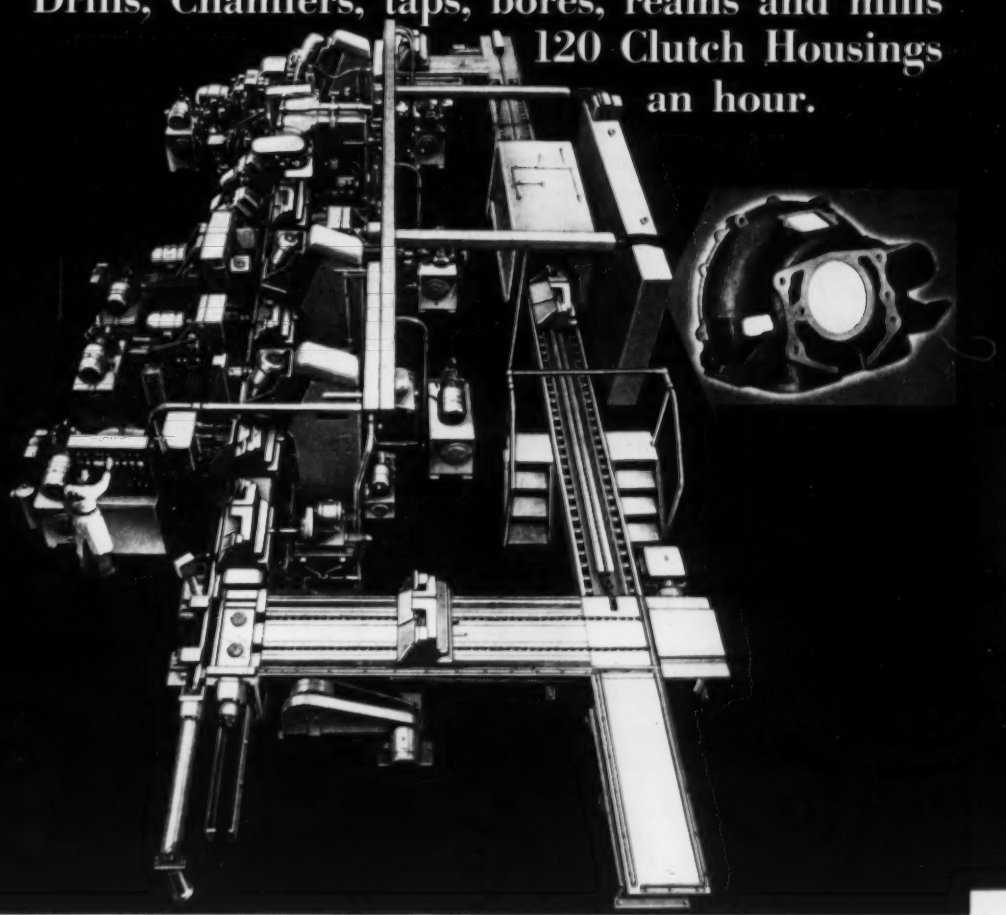
As a new subscriber to STEEL, I have noted in the "Letters to the Editors" column an article entitled "What About Your Safety Program?" (Nov. 30, p. 101). If copies of that article are available, I would appreciate your furnishing us with one.

H. E. Fischer
Valley Forge Products Inc.
Long Island City, N. Y.

• *Being Sent.—ED.*

Buhr SPECIAL...

Drills, Chamfers, taps, bores, reams and mills 120 Clutch Housings an hour.



Designed to perform identical operations on two different parts.
Through Selector Switches, change-over from one part to the other takes only seconds.
Twelve stations perform all 68 operations.
Fixtures automatically indexed from station to station, and go through Cleaning Station on return to Load Station, where Power Wrench clamps and unclamps.
Production is 120 parts per hour at 100% efficieney.

BUHR MACHINE TOOL CO.
ANN ARBOR, MICHIGAN

TYPICAL STANDARD BUHR FEATURES INCLUDE:

- ★ Built-in chip conveyor.
- ★ Automatic lubrication throughout.
- ★ Hydraulic and electrical equipment to J.I.C. standards.
- ★ Hardened and ground tool-steel ways.

Write for Buhr 48-page Catalog

Buhr
MULTIPLE-SPINDLE
HIGH PRODUCTION MACHINERY

"WE GET BROACHING SERVICE"

by Master Mechanic

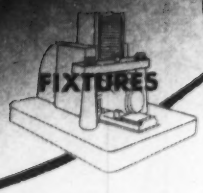
Leading Automotive Parts Maker

We have been relying on Colonial Broach Company for all phases of broaching—engineering, manufacturing, and service—for over 25 years.

Several of our Colonial 10-ton pull-ups and horizontals have been in continuous use, at times on a three shift basis, since 1936, broaching gears, splines, etc., for tractor and automotive transmissions. Today, over 80% of the broaching machines in our shop, on both internal and surface broaching operations, are Colonials.

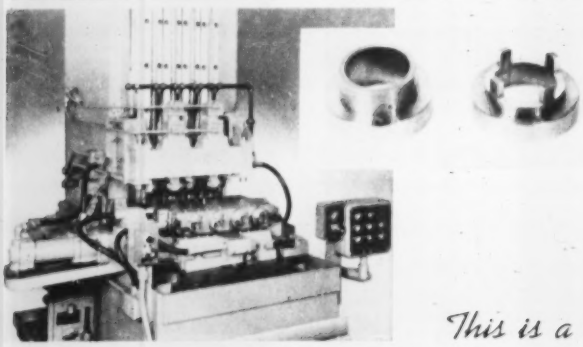
Engineering cooperation on fixture design from Colonial is the best. We get exactly what we require for both internal and surface broaching applications, and we get it promptly.

Colonial supplies the greatest percentage of our broaches. Design, accuracy, broach life, and resharpening service are all that we could ask. In all our 25 years of dealings, Colonial has never failed us when we had to have something in a hurry



COLONIAL BROACH CO. DETROIT 13

Unified Broaching



2-STEP BROACHING—280 GEARS per hr.

Four tangs on 280 automotive oil pump drive gears per hour are broached in two steps on a Colonial RS-10-54 single ram broaching machine. Tangs are 0.345" x 0.431".

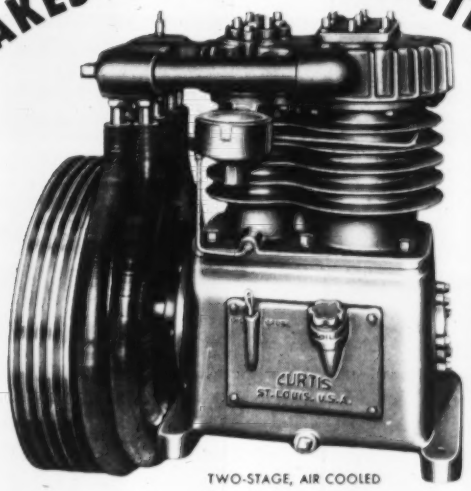
Four parts are broached on one side of a 180° indexing shuttle fixture, while broached parts are unloaded from outside stations, semi-finished parts are moved from inner to outer stations, and blanks mounted on inner stations. Fixture recedes, indexes 180° as broach returns, then advances to broaching position, and cycle is repeated.

This is a Colonial Unified Broaching Installation

Dependable, Efficient

Curtis AIR COMPRESSORS AIR HOISTS AIR CYLINDERS

MAKES YOUR PRODUCTION MORE PROFITABLE

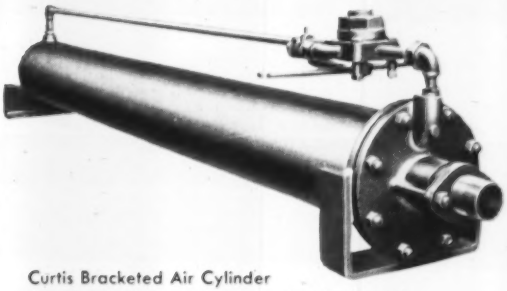


TWO-STAGE, AIR COOLED

PRECISION BUILT COMPRESSORS UP TO 50 H.P.

- Advanced two-stage design saves electric current.
- Delivers more air per horsepower.
- Timken tapered main bearings.
- Pressure lubricated rod and piston bearings.
- Assures long trouble-free performance.

TIME-SAVING Curtis Air Cylinders and Air Hoists



Curtis Bracketed Air Cylinder can be placed in any position from horizontal to vertical. Will lift, lower, push or pull.

- Low-Cost lifting, lowering, pushing, or pulling
- Accurately controlled operating speed
- Cylinders are ground and polished
- Valve is of disc type lapped to its seat.

Curtis Pendant Air Hoist for any lifting or lowering job where headroom is not limited.

FOR COMPLETE INFORMATION and technical data, mail this coupon today . . .

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of Curtis Manufacturing Company
1996 Kienlen Avenue, St. Louis 20, Mo.
99 Years of Successful Manufacturing Experience

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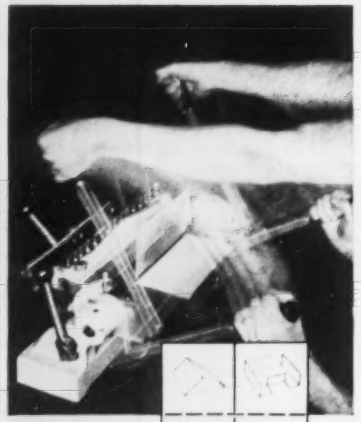

a 4 in 1

metal working tool!

***di-acro** BOX FINGER BRAKE**

Accurately, Easily, Quickly Form and Duplicate a Wide Variety of Shapes in Metal as Heavy as 16 Gauge—Widths up to 24" —with Versatile Di-Acro Brakes.

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- **Bar Folder** — when an Acute Angle Bar replaces the Box Finger Bar mounting.
- **Standard Brake** — when a Forming Bar is mounted for heavy operations.

Di-Acro Standard and Radius Brakes are also available. Ten models in all.

**pronounced Die-ack-ro*

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Gives facts on Di-Acro Brakes and also both hand and power operated Di-Acro Benders, Notchers, Punch Presses, Rod Parters, Rollers and Shears. Mail your request today.

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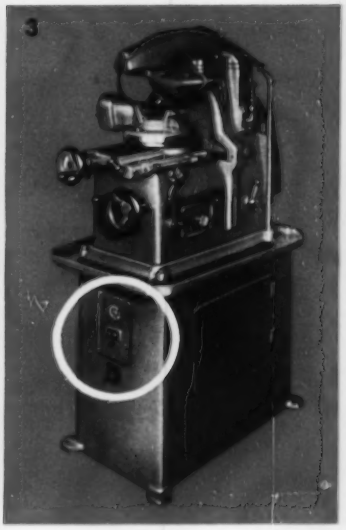


When you *design* a new machine

modernize its appearance with flush-type starters

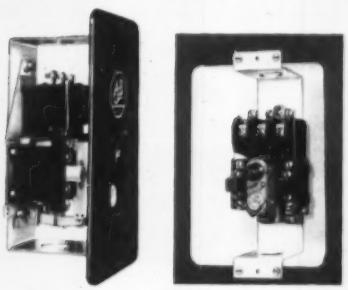
It is a sales asset to any device to have a trim, streamlined appearance . . . and it costs so little if you think of it while your product is still on the drawing board. A good place to start is to include convenient recesses or cavities in your machine frames or pedestals for flush-type Allen-Bradley motor controls.

Allen-Bradley manual and magnetic starters are available in snappy looking faceplates and skeleton mountings, ready to slip into your machine frames. See illustrations above.

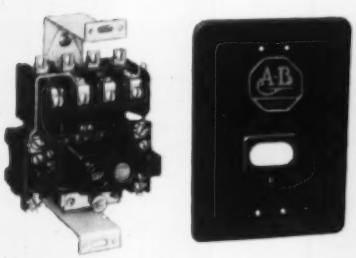
Your nearest Allen-Bradley control engineer will gladly call at your convenience and discuss the flush-type starters best suited to your need. (See illustrations at left.) Allen-Bradley controls are your assurance of trouble free operation and long life.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

FLUSH-TYPE MOTOR STARTERS



Bulletin 609 Size 1 Manual Starters
for flush cavity mountings



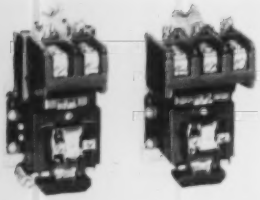
Bulletin 709 Size 1 Solenoid Starters
for flush cavity mountings

1-54-R

ALLEN-BRADLEY
MOTOR CONTROL
QUALITY

CONTACTORS

A-C & D-C • Sizes 00 to 7 • Ratings 10 to 900 Amperes

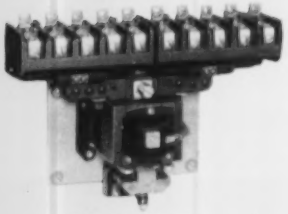


2 pole—Size 1
25 ampere

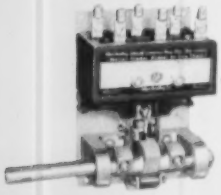
3 pole—Size 1
25 ampere

4 pole—Size 1
25 ampere

5 pole—Size 1
25 ampere

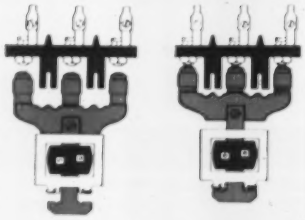


10 pole—Size 1
25 ampere



3 pole—Size 2
50 ampere
cam-operated
contactor

ALL SOLENOID OPERATED

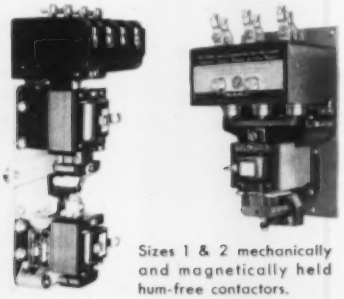


Contacts Open Contacts Closed

Here is the only complete line of solenoid contactors on the market . . . We have nine sizes from the little Size 00 (10 amperes) to the big Size 7 (900 amperes).

What does this mean to you? It means that all of your contactor requirements . . . from the smallest to the largest . . . can be met with Allen-Bradley trouble free solenoid controls. There is no contact maintenance . . . no pins, pivots, or bearings to stick and give trouble. Just one moving part—the simple solenoid plunger. Operating characteristics are consistent throughout all nine sizes.

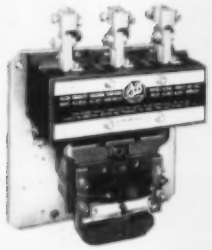
Enclosures are available, too, for general purpose, watertight, dust-tight, and explosion-proof service. Allen-Bradley controls are a sales asset to any electrical device. May we send you our latest catalog?



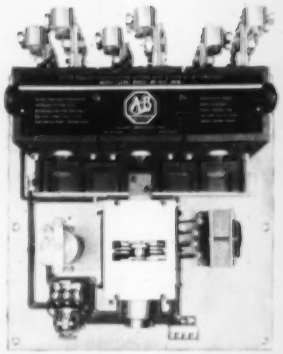
Sizes 1 & 2 mechanically and magnetically held hum-free contactors.

2 pole—Size 2
50 ampere

3 pole—Size 2
50 ampere



3 pole—Sizes 4 & 5
150 & 300 ampere
contactors



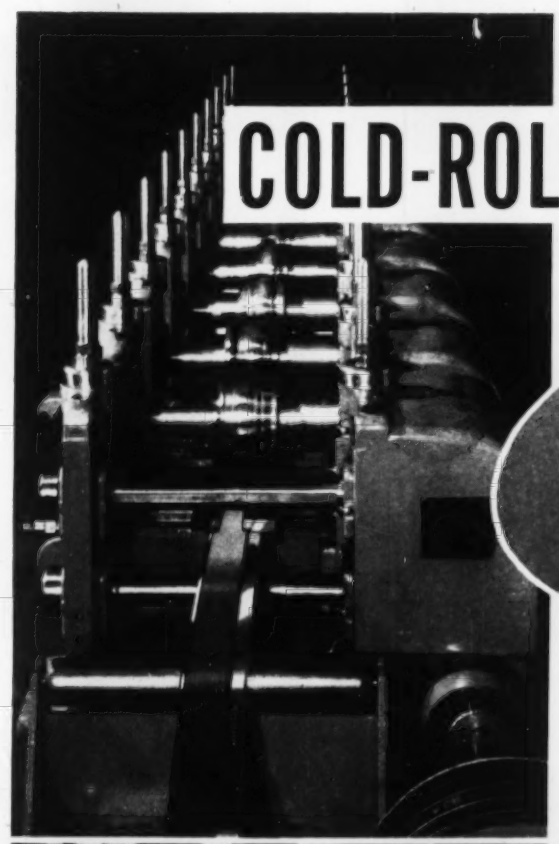
3 pole—Sizes 6 & 7
600 & 900 ampere contactors

Allen-Bradley Co.
1316 S. Second St.
Milwaukee 4, Wisconsin

A-B Quality

ALLEN-BRADLEY
SOLENOID CONTACTORS
QUALITY

1-54-R



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a CHALLENGE and a PROMISE

Cold Roll Forming holds a perpetual challenge to your skill and ingenuity in devising new ways to step up production and reduce cost. Infinite possibilities are suggested by thousands of existing applications in the high-production metal working industries.

New applications are constantly being discovered. Total production of Yoder cold roll forming machines now runs into billions of feet annually.

A Yoder roll forming machine can be arranged for doing other operations, such as notching, embossing, perforating, curving, coiling, welding, etc., at little or no extra labor cost. Yoder engineers are at your service in designing such multi-purpose production lines.

The Yoder Book on Cold Roll Forming discusses its varied functions and advantages, with scores of photos illustrating end uses of roll formed products. Ask for it.

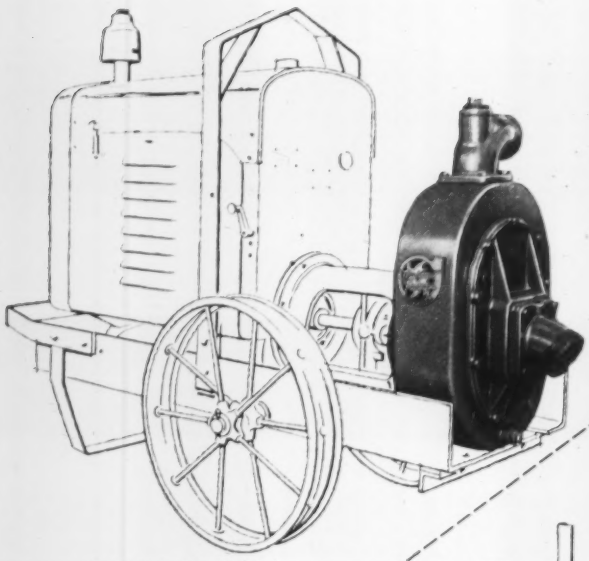
THE YODER COMPANY

5502 Walworth Ave. • Cleveland 2, Ohio

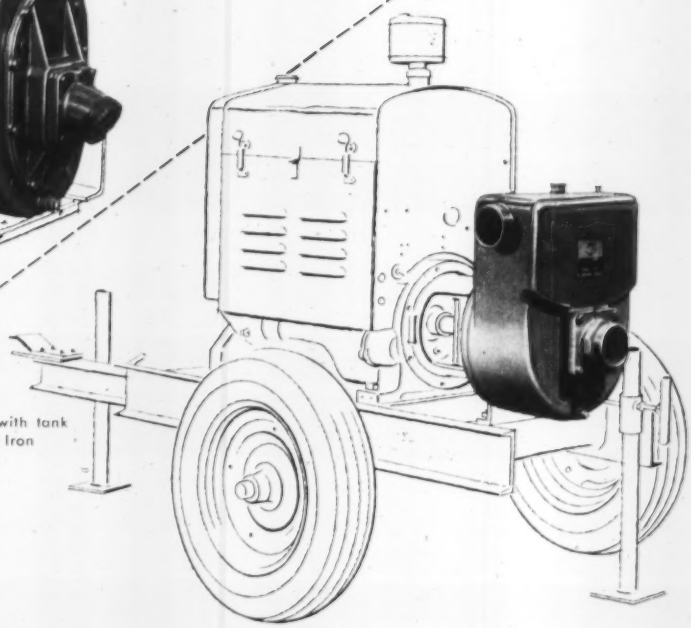
Complete Production Lines

- ★ COLD-ROLL-FORMING and auxiliary machinery
- ★ GANG SLITTING LINES for Coils and Sheets
- ★ PIPE and TUBE MILLS–cold forming and welding

ENGINEERING YODER MANUFACTURING



Portable pump with fabricated steel tank



Portable pump with tank cast in Gray Iron

Costs down 20%... efficiency up with GRAY IRON!

This Marlow portable self-priming centrifugal pump originally was made with a fabricated steel pump tank. In modernizing the unit the manufacturer redesigned the tank for production in Gray Iron, thus realizing a *20% saving in costs* . . . as well as substantially increased efficiency over the fabricated tank previously used.

This same type of cost-saving story may be told about some of your fabricated parts, if you take the time to consider the many advantages of the Gray Iron casting process. Write for technical information.

GRAY IRON CHARACTERISTICS INCLUDE:

CASTABILITY
STRENGTH
RIGIDITY
LOW NOTCH SENSITIVITY
WEAR RESISTANCE
HEAT RESISTANCE
CORROSION RESISTANCE
DURABILITY
VIBRATION ABSORPTION
MACHINABILITY

MAKE IT *BETTER*...WITH GRAY IRON

75% of all cast metal products are Gray Iron

GRAY IRON FOUNDERS' SOCIETY, INC.

NATIONAL CITY-E. 6th BLDG., CLEVELAND 14, OHIO

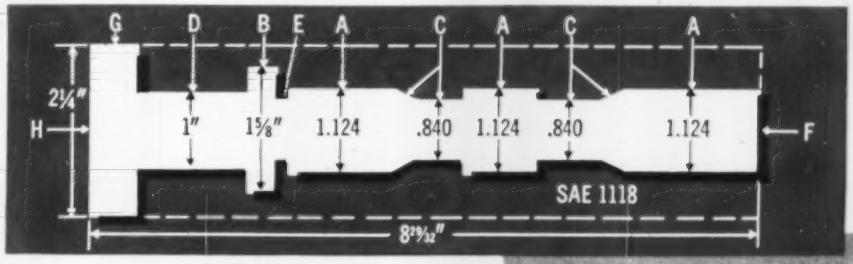
This is the difference High Velocity Turning makes

this job took...

11.50 min.

FLOOR TO FLOOR

A. Turn — 694 RPM — .015" Feed
B. Turn — 489 RPM — .015" Feed
C. } Form — 119 RPM — .0025" Feed
D. }
E. Face, shoulder, neck, undercut, HSS
F. Face 243 RPM — .0035" Feed
G. Knurl
H. Cut off — 243 RPM — .0035" Feed



IN 1954 this same job takes...

5.00 min.

FLOOR TO FLOOR

A. Turn — 1000 RPM — .022" Feed
B. Turn — 1000 RPM — .022" Feed
C. } Form — 340 RPM — .0035" Feed
D. }
E. Face, shoulder, neck, undercut
F. Face 489 RPM — .0055" Feed
G. Knurl
H. Cut off — 489 RPM — .0055" Feed

J & L TURRET LATHES GIVE...

MORE Ease of Operation
MORE Power Transmission
MORE Rigidity
MORE Accurate Stops
MORE Efficient Lubrication
MORE Coolant on Cutting Tools
MORE Accurate Results

Turning out a job like this in 5 min. calls for a lathe with plenty of power and the beef to back it up . . . a lathe like the Jones & Lamson #7A Universal Turret Lathe, which is specially designed to meet today's demand for more production at lower unit costs.

Only with a lathe like this can your shop take full advantage of the quality, productivity and lower costs offered by High Velocity Turning.

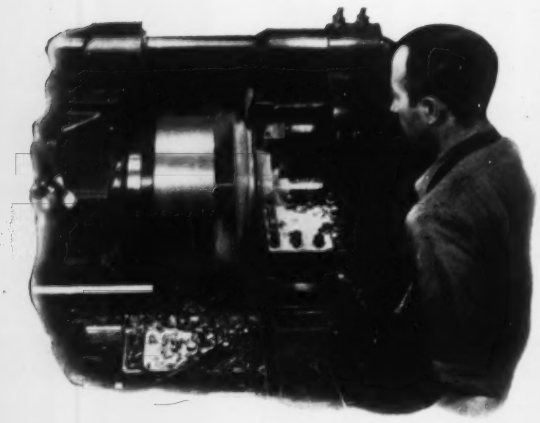
This job is one of the many turned at high speeds on our production line. Come to Springfield and see for yourself. At any rate, send for catalogs #101-A and #102.

JONES & LAMSON

Machine Tool Craftsmen Since 1835

JONES & LAMSON MACHINE CO., 517 Clinton St., Dept. 710, Springfield, Vt., U.S.A.

J&L MACHINE TOOL DIV.



. . . the shapers of things to come —

ALLEGHENY LUDLUM HIGH SPEED STEEL TOOL BITS

In a complete range of tungsten, moly, cobalt, and high vanadium types

PANTHER 5
SUPER PANTHER
PANTHER SPECIAL
ML, LXX, SUPER DBL
DBL-3 AND DBL-2

Cut to length . . . bevelled both ends . . . heat-treated to perfection. Just shape the point and you're all ready to go . . . A-L Tool Bits are the last word in convenience.

Made in a complete range of tungsten and moly high speed steels . . . including the new cobalt and high vanadium types that offer superior red hardness, wear-resisting and cutting properties.

Furnished in Standard finish or the popular Ground finish which is extremely accurate in dimension and free from decarburization and scale.

For real Johnny-on-the-spot service on the finest tool bits obtainable, call your local A-L office or distributor . . . TODAY! • *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.*

For complete **MODERN** Tooling, call

Allegheny Ludlum

W&D 4683

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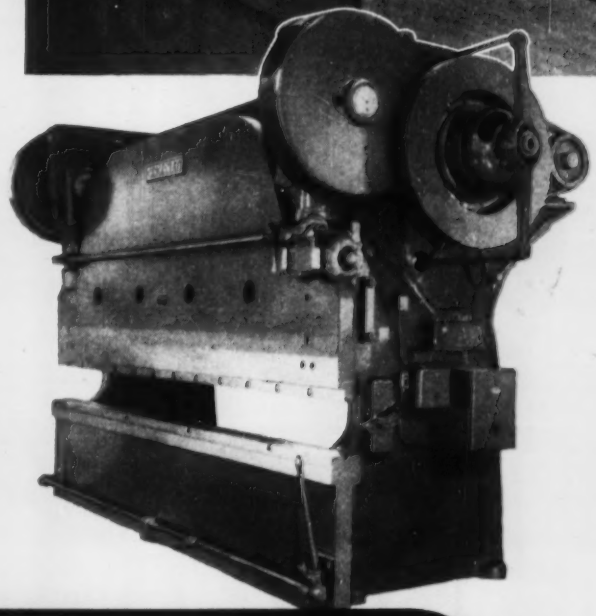
FINE TOOL STEELS
SINCE 1854

another accurate job...

ONE OF A LONG LIST

Bolted on angle brackets for bed and ram give wide die surfaces. Easily installed and removed they allow versatile Cincinnati Press Brakes to do press work. Here stiffeners for pontoons are being accurately formed—3 bends at each stroke. It is one of the many types of jobs handled economically on versatile Cincinnati Press Brakes.

Write for the New 72 page Press Brake Catalog B-4.



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CINCINNATI 25, OHIO, U.S.A.

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McKee 16
Wind Box
Sintering Machine

POLLOCK

chosen to construct latest sintering plant equipment

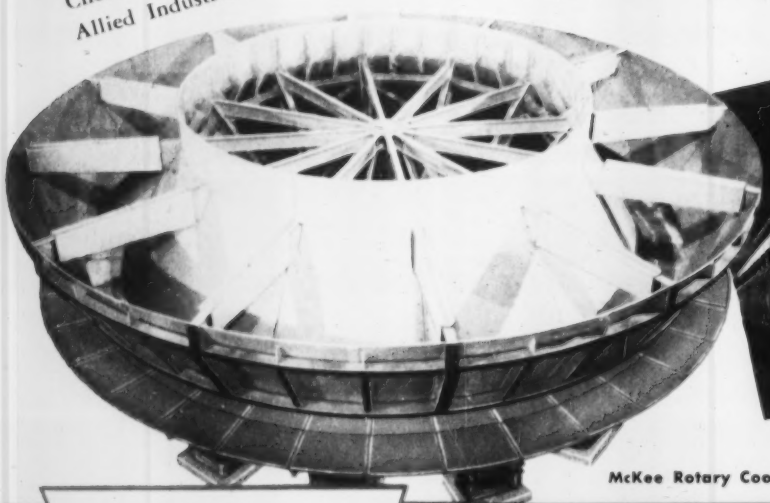
TO construct its newly developed sintering plant equipment, Cleveland's Arthur G. McKee Company chose The William B. Pollock Company, steel plate construction experts since 1863.

This latest sintering machine and rotary cooler were assembled in Pollock's Youngstown, Ohio plant and inspected by the customer and many interested iron and steel operators and engineers while in test operation. Then it was thoroughly match-marked, disassembled, and loaded on 16 railroad cars in such a way as to insure quick and efficient field erection.

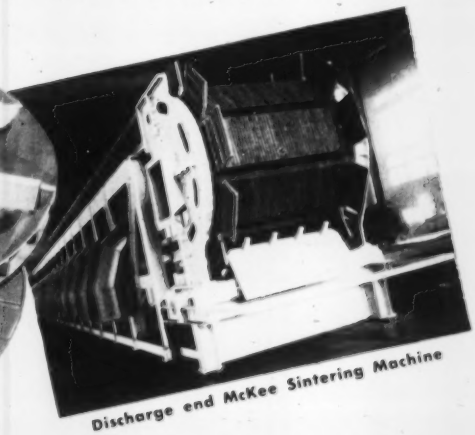
Pollock is known the world over for its reliable, efficient heavy plate construction.

POLLOCK ALSO MAKES . . .

Miscellaneous Welded and Riveted Steel Plate Work for Blast Furnaces and Steel Plants, Oil Refineries, Chemical Plants and Allied Industries.



McKee Rotary Cooler 48 Ft. 4 In. Diameter



Discharge end McKee Sintering Machine

POLLOCK

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YOUNGSTOWN · OHIO
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BLAST FURNACES · HOT METAL CARS AND LADLES · CINDER AND SLAG CARS · INGOT MOULD CARS · CHARGING BOX CARS · WELDED OPEN HEARTH LADLES

CALENDAR
OF MEETINGS

February 1-2, Annual Industrial Engineering Institute: University of California, Los Angeles. General chairman, Bruce G. McCauley, University of California, College of Engineering, Berkeley 4, Calif.

February 1-5, American Society for Testing Materials: Spring meeting, Hotel Shoreham, Washington. Society address: 1916 Race St., Philadelphia 3. Executive secretary: Robert J. Painter.

February 3-5, Society of the Plastics Industry Inc.: Annual reinforced plastics division conference, Edgewater Beach hotel, Chicago. Society address: 67 W. 44th St., New York 36. Executive vice president: William T. Cruse.

February 4, Instrument Society of America: Annual regional conference, Hotel Statler, New York. Society address: 1319 Allegheny Ave., Pittsburgh 33. Secretary: P. V. Jones, Jr.

February 5-6, National Association of Cost Accountants: New York regional conference, Hotel Roosevelt, New York. Association address: 505 Park Ave., New York 22. Secretary: A. B. Gunnerson.

February 11-12, Western Computer Conference & Exhibit: Ambassador hotel, Los Angeles. Information: H. G. Weightman, 1405 W. Magnolia Blvd., Burbank, Calif.

February 13-18, Automotive Electric Association: Annual meeting, Edgewater Beach hotel, Chicago. Association address: 802 Michigan Bldg., Detroit. Executive secretary: S. W. Potter.

February 15, American Society of Civil Engineers: Winter meeting, Hotel Biltmore, Atlanta. Society address: 33 W. 39th St., New York. Executive secretary: Col. William N. Carey.

February 15-17, American Management Association: Personnel conference, Palmer House, Chicago. Association address: 330 W. 42nd St., New York. Vice president-secretary: James O. Rice.

February 15-17, Association of Iron & Steel Engineers: West coast meeting, Hotel Statler, Los Angeles. Association address: 1010 Empire Bldg., Pittsburgh 22. Managing director: T. J. Ess.

February 15-17, National Welding Supply Association: Annual meeting, Fairmount hotel, San Francisco. Association address: 1900 Arch St., Philadelphia 3. Secretary: Robert C. Fernley.

February 15-18, American Institute of Mining & Metallurgical Engineers: Annual meeting, Hotels Statler and McAlpin, New York. Institute address: 29 W. 39th St., New York. Secretary: E. H. Robie.

February 22-25, Annual Industrial Ventilation Conference: Kellogg Center, Michigan State College, East Lansing, Mich. Information: Continuing Education Service, Michigan State College, East Lansing, Mich.

March 1-5, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy and Exposition of Modern Laboratory Equipment: Hotel William Penn, Pittsburgh. Information: L. D. Frederickson Jr., P.O. Box 772, New Kensington, Pa.

March 2-4, American Machine Tool Distributors Association: Spring meeting, Boca Raton hotel and club, Boca Raton, Fla. Association address: 1900 Arch St., Philadelphia 3. Executive secretary: Thomas A. Fernley Jr.

March 3, Steel Kitchen Cabinet Manufacturers Association: Spring meeting, New York. Association address: Engineers Bldg., Cleveland 14. Executive secretary: Arthur J. Tuscany Jr.

March 4-5, American Society for Metals: Midwinter meeting, Hotel Statler, Boston. Society address: 7301 Euclid Ave., Cleveland. Secretary: W. H. Eisenman.

March 8-12, National Electrical Manufacturers Association: Mid-winter meeting, Edgewater Beach hotel, Chicago. Association address: 155 E. 44th St., New York 17. Managing director: W. J. Donald.

March 10-12, American Society of Mechanical Engineers: International meeting, Mexico City, D. F. Society address: 29 W. 39th St., New York. Secretary: C. E. Davies.

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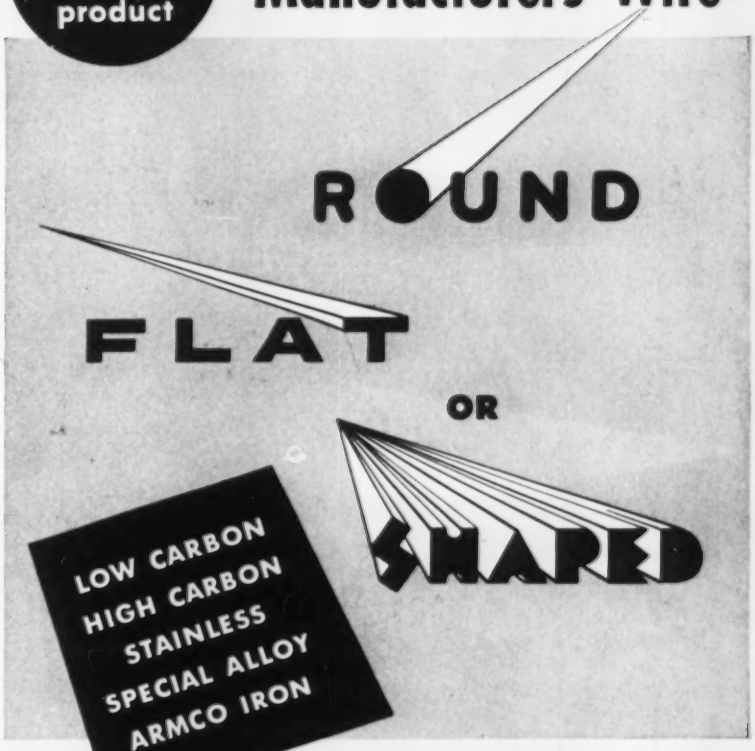
PAGE
Manufacturers' Wire



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YOU draw the Shape...
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Cross-sectional areas up to .250" square; widths up to 3/8"; width-to-thickness ratio not to exceed 6 to 1.

Tell us the way you want it. We'll follow your specifications.

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AMERICAN CHAIN & CABLE

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Portland, San Francisco, Bridgeport, Conn.

plus Welding Electrodes Wires Rods

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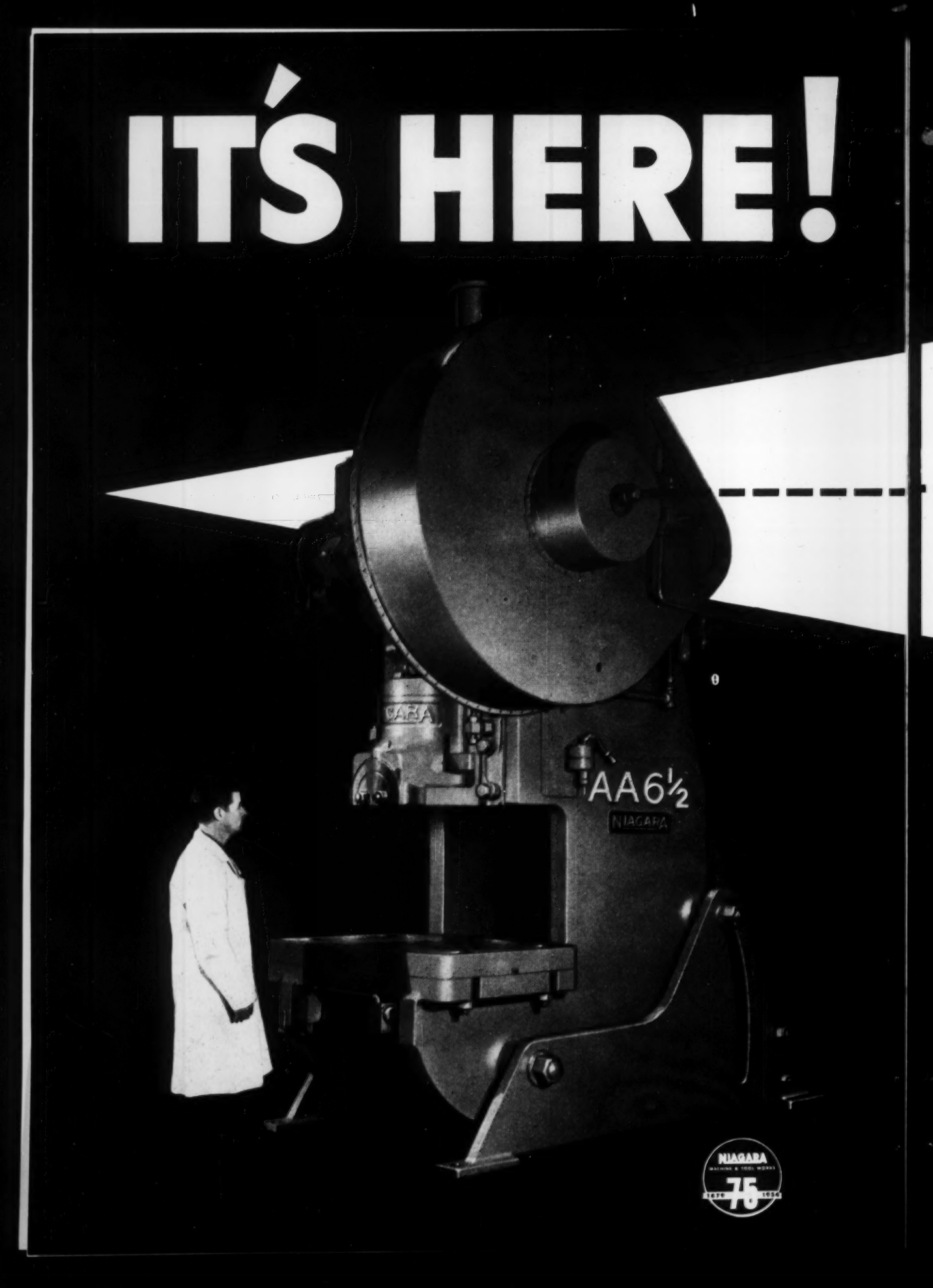
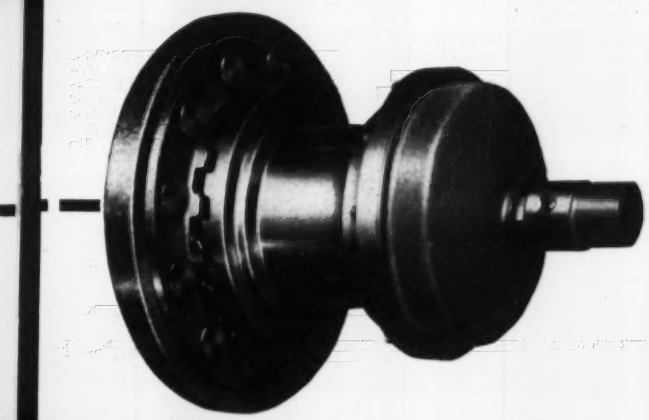


..a great, new line of inclinable presses



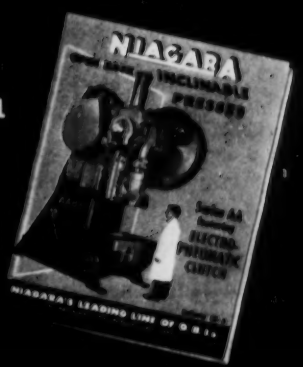
FEATURING
the exclusive Niagara Electro-Pneumatic Clutch

- Combines prime advantages of friction and mechanical sleeve clutches.
- Has no friction surfaces to slip, heat or wear.
- Provides a positive drive that engages or disengages instantly, at any point in stroke.
- Can be single-stroked, jogged or run continuously.
- Operates effortlessly by palm buttons or foot switch.
- Stops automatically if power or air pressure fails — an important safety feature.

Never before in O. B. I. Press history, has there been so significant a development as this new Niagara line . . . Series AA. Built in eight sizes, with shaft diameters from 3 to 7½ inches, it has set a new high for performance and stamina in blanking, forming, drawing, perforating, combination die and automatic feeding operations.

Get the complete story. Send for literature. Talk with our representative. SEE the press in action. Compare! Then, decide.

AND YOU'LL FIND ALL THE FACTS IN HERE!
BULLETIN 57-A
Sent free...promptly!



NIAGARA

America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work

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DISTRICT OFFICES: DETROIT • CLEVELAND • NEW YORK • PHILADELPHIA
Dealers in principal U. S. cities and major foreign countries

"We Trim Castings 4 Times Faster" with MULTIPRESS®

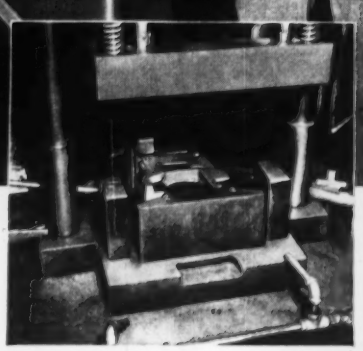
—and get uniformly better results, reports The Hoover Co., North Canton, Ohio, world's largest manufacturer of electric cleaners for home use!

Using a 25-ton Multipress to trim large cast-aluminum housings for the famous Hoover Electric Cleaners, one man averages more units per hour than four men could handle by the old method.

The smooth hydraulic stroke of the Multipress ram does the job better, Hoover reports. Uniform accuracy is maintained automatically. Down-time resulting from damaged dies is held to near-zero. And because Multipress trims the castings *inside and out* in one fast, easy, precision operation, damage from rough, multiple handling has been sharply reduced.

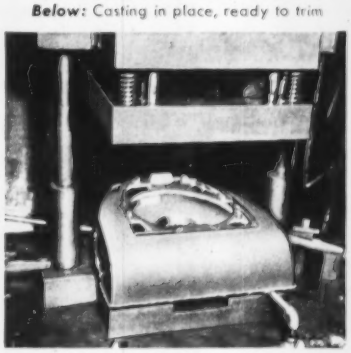
Other Multipress advantages listed by Hoover include fewer rejects or throw-outs, greater safety for the operator, lower tool and die costs, quicker, easier tool change-over, and major savings in floor space for all trimming operations.

Hoover is now using 14 Multipresses of one-ton, 4-ton, and 25-ton capacities. In addition to manufacturing electric irons, washing machines, floor polishers, and electric motors, Hoover produces die castings for other leading manufacturers.



Above: 25-TON Multipress in operation at Hoover plant in North Canton, Ohio

Above: Close-up of Multipress Tooling
Below: Casting in place, ready to trim



Multipress is bringing production gains like these to hundreds of manufacturers. Advanced valving and controls give Multipress smooth oil-hydraulic action plus quick, easy, stepless adjustments in ram speed, stroke length, and pressure. A wide choice of manual or automatic controls covers any need for single or sequence operations. Automatic feeds and other auxiliary Multipress equipment provide extra speed and efficiency on many types of operations. Multipress is built in nine frame sizes, with pressure capacities from one to 75 tons.

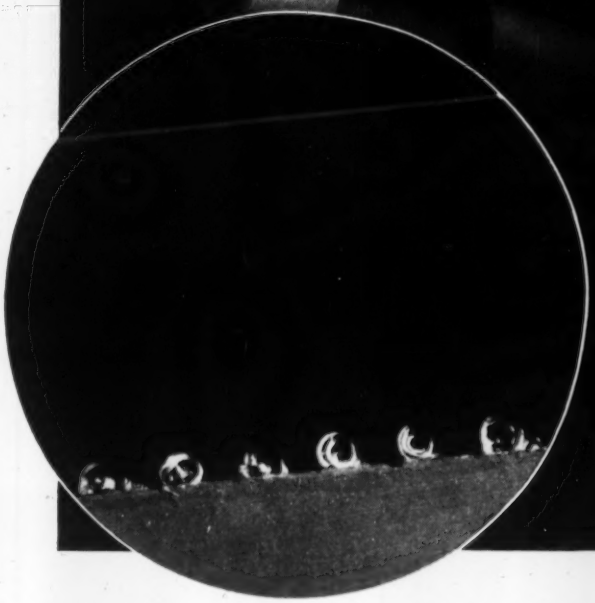
DENISON Hydr OIL ics

PUMPS | MOTORS | CONTROLS | PRESSES

Write for complete information on the Denison Multipress. . . there's no obligation!

THE DENISON ENGINEERING CO., 1163 Dublin Rd., COLUMBUS 16, OHIO

More Mileage Here



Starts Here with a SIMONDS "RED END" POWER HACK-SAW BLADE

What makes a "Red End" Blade cut better, last longer on the average than other blades? The answer's in the picture. Every "Red End" tooth takes exactly the same bite, curls the chip like a cutting tool on a lathe.

Because every tooth in every "Red End" Blade *is* exactly the same. It's all in the way we pour and roll our own steel . . . the way we mill the teeth to exact size and shape . . . set them evenly and accurately . . . and the special way we heat-treat them to a *uniform* hardness never believed possible before.

The result is *faster*, *straighter* cutting, and *many more* cuts per blade. If you haven't tried them yet—your local Industrial supply Distributor stocks 'em. Get some today and see.

There's a RED END Blade For Every Job

HIGH SPEED MOLYBDENUM — the RED Blade for cutting mild alloy steels and general purpose use.

HIGH SPEED TUNGSTEN — the GREY Blade for cutting hard alloys and stainless steels.

HIGH SPEED WELD-EDGE — the SHATTERPROOF Blade for use where maximum safety is required.

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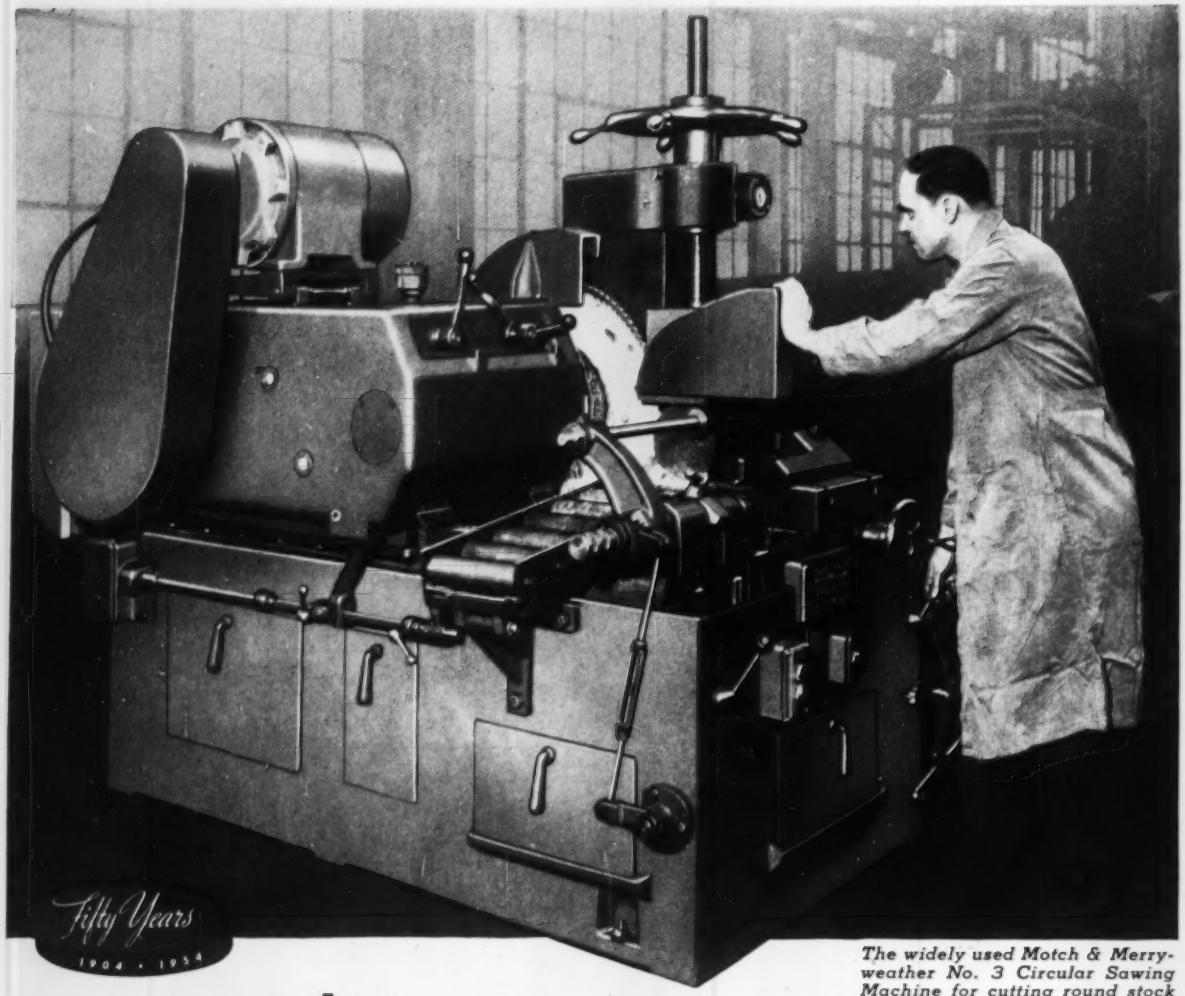
Simonds Abrasive Co., Phila., Pa. and Arvida, Que., Canada



The widely used Motch & Merryweather No. 3 Circular Sawing Machine for cutting round stock up to 10" diameter.

remember...

It's the Cost per Cut that Counts!

SECURE HIGH PRODUCTION AT LOW COST

For every ferrous or non-ferrous metal, for any shape or size, for production or short runs, – study *new high* records made by Motch & Merryweather Circular Sawing Machines employing the Triple-Chip Method and available in:

A complete size range for cutting stock up to 43" diameter.

THE MOTCH & MERRYWEATHER MACHINERY CO.

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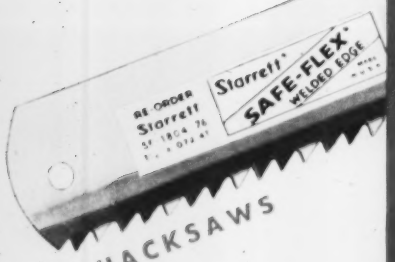

1 THE COMPLETE LINE

Hacksaws, band saws and band knives in all types and sizes to meet all requirements . . . all from one dependable source.

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Precision made to insure correct set for clearance, exact size, uniform temper and maximum cutting ability.

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Stocked and sold by industrial distributors everywhere for prompt, dependable, on-the-spot service.

GUIDES TO LOWER CUTTING COSTS

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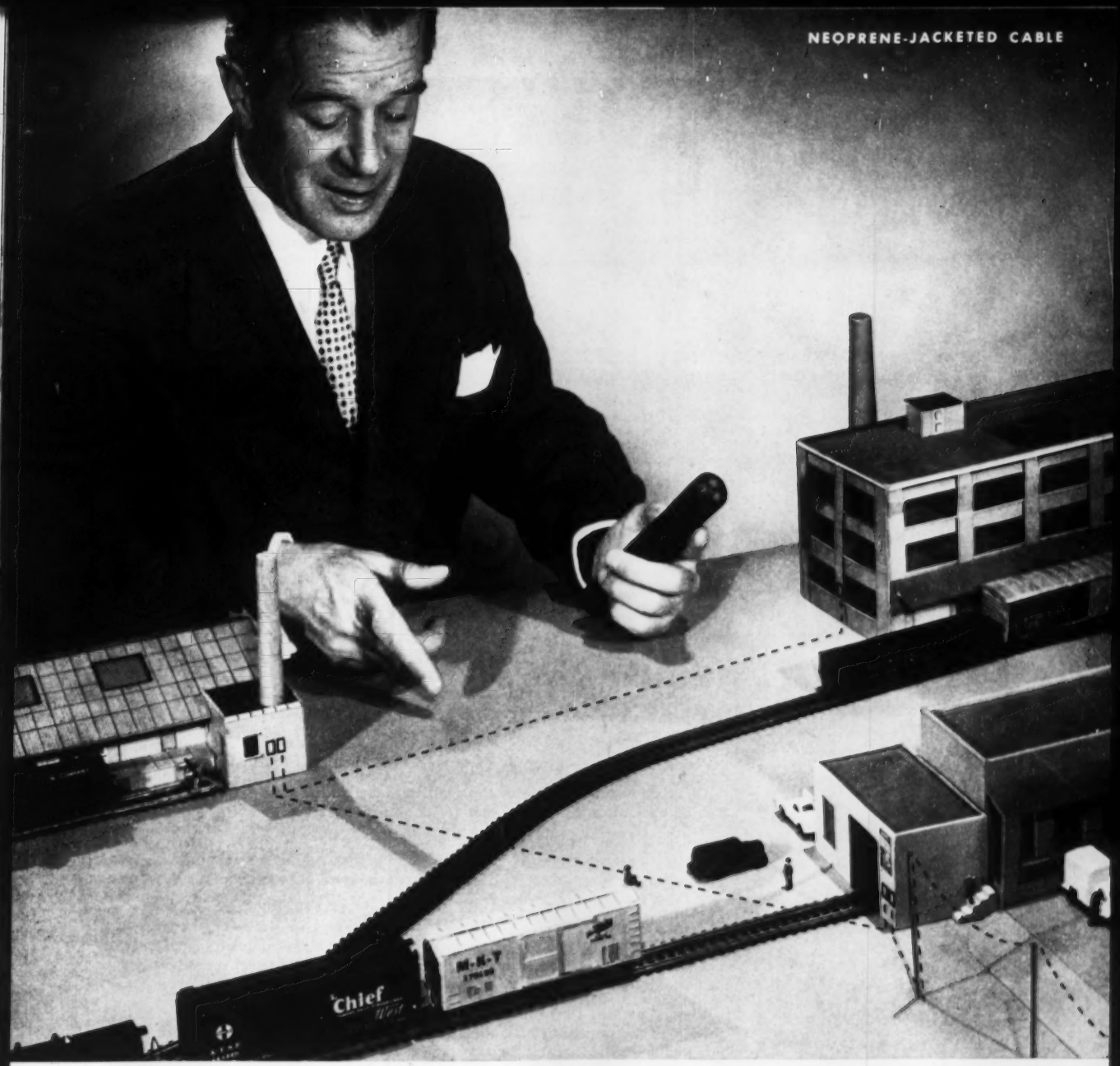

Durasheath: saves needless power-line jointing

Why complicate cable installations by shifting from buried to duct or aerial types in industrial plant feeder lines? Flexible, easily handled DURASHEATH* Cable can cut your costs. You can run this tough, versatile cable underground directly in the earth, overhead or in ducts (or in any combination) without needless, time-consuming jointing. Its light weight and flexibility make duct pulling fast even in zero weather. Aerial assemblies go faster. Linemen like to work with it. You stock only one cable type—all-purpose DURASHEATH.

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As one of several types of ANACONDA power cables, DURASHEATH is available in all sizes, single or multiconductor, copper or aluminum, from 600 to 15,000 volts. It is thoroughly dependable for industrial plants, railroads, series or multiple street lighting, airport† lighting, residential primaries and secondaries, as well as for such uses as Type USE cable for underground service entrance. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

*Reg. U. S. Pat. Off. 55317

ANACONDA®

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†When ordered to CAA Specification L-824

ENDURO BRIGHTWORK . . .

gets them all talking SALES

People are favorably impressed by well-chosen ENDURO Stainless Steel brightwork.

It's an unmistakable sign of top quality in a manufactured product. It's a point to talk about as another reason for choosing your line.

And, there's no reason why your products shouldn't have this sales advantage *now*. You and your suppliers can fabricate ENDURO Stainless Steel on your present equipment with little or no change in procedures. There's no plating, painting or other finishing needed. As compared with forming, then cleaning, then plating, then polishing; cost is very attractive.

With ENDURO, you have brightwork that stays bright. It resists rust and corrosion, doesn't tarnish. It has no plating to chip, peel or flake. It's superbly easy to clean and to keep clean. It stays bright for the life of the product.

When your sales staff can point out to distributors and jobbers that your brightwork is genuine ENDURO Stainless Steel . . . when distributors can tell dealers . . . when dealers can tell their customers . . . and housewives can tell one another . . . then you've got them all talking sales! Republic will help you choose proper ENDURO Types and fabricating procedures. *Write:*

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Export Department: Chrysler Building, New York 17, N. Y.

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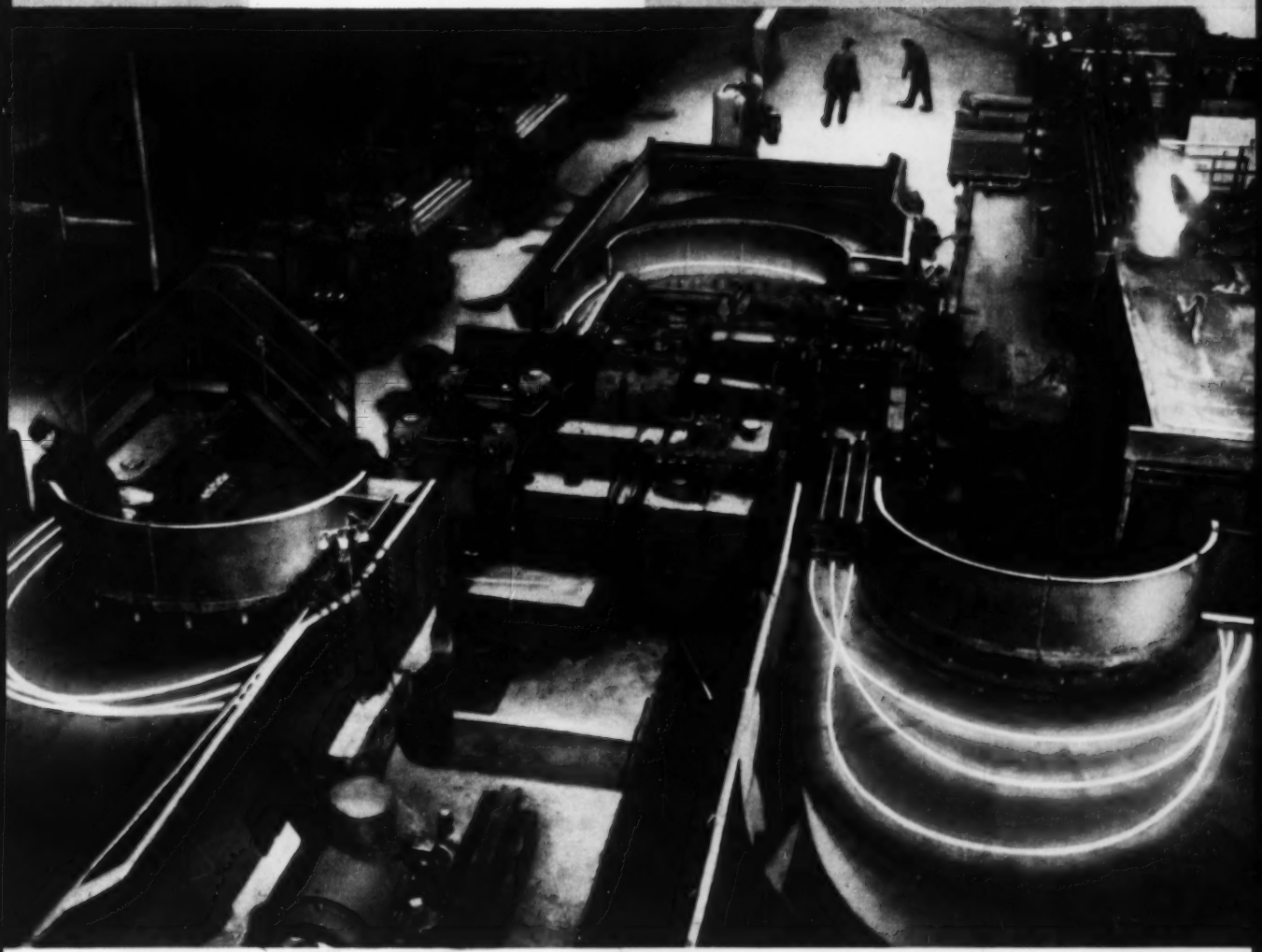
Other Republic Products include Carbon and Alloy Steels—Pipe, Sheets, Strip, Plates, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing

UNITED

RENDLEMAN ROD MILL

HIGHER PRODUCTION RATE THAN ATTAINED ON ANY OTHER ROD MILL *



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*

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- **FEWER ROLL CHANGES REQUIRED.**
- **LOWER ROLL and GUIDE MAINTENANCE COST.**
- **BETTER QUALITY RODS AT LOWER COST.**

UNITED *can serve you no matter where in the world you are.*

As part of a continuing national expansion program, Ryerson has just opened this new plant opposite the Wisconsin State Fair Grounds in Milwaukee. Its big spans are more than 800 feet long. Exterior walls are sheathed in lustrous stainless steel.

Ryerson opens nation's most modern steel service plant

To provide better service in the Milwaukee area, we have opened what we believe is the nation's most modern steel service plant. Our new plant is over four times the size of the old plant from which we have served Milwaukee for over a quarter of a century.

These larger facilities, larger stocks and larger staff of experienced steel men are part of a continuing Ryerson program to bring you the steel you need, when you need it—certified for quality and cut and processed to the most exacting specifications.

So, for quicker, more helpful, more *complete* steel service—in Milwaukee and in every other industrial area—call Ryerson, the nation's best equipped steel service organization.

Principal Products: Bars, structurals, plates, sheets, mechanical and boiler tubes, reinforcing—carbon, alloy, stainless and tool steels, machinery & tools.

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Metalworking Outlook

February 1, 1954

Spending Has Started

The $1-billion expansion by General Motors Corp. is already under way. Chevrolet Division, for example, is currently adding 22 per cent to its capacity by building 5 million square feet of plants and additions. Pontiac Motor Division has undertaken at Pontiac, Mich., an expansion and modernization program which will increase plant area more than 1.3 million square feet to a total of 6.7 million square feet. Pontiac's program also involves expenditures for new machine tools and other equipment.

$26-Billion Expansion

Programs like General Motors' indicate that new plant and equipment expenditures for all U.S. industry may hit $26 billion in 1954, off only 6 per cent from the $27.8 billion of 1953. Achievement of this year's goal will be helped by the steel industry's plans to spend $775 million (p. 45), by many other industry programs to finance expansions privately, by continuing government efforts to expand the mobilization base and by reform in depreciation tax laws. In mobilization base areas, the U.S. is stressing the need for more capacity to produce heavy gray iron castings and steel castings. The targets thus far are only 15.5 and 52 per cent reached.

Ohio Leads

Ohio, with a 1,744,800-ton expansion in steel capacity, led all the states in 1953 in the national 6.8-million-ton gain in the potential. American Iron & Steel Institute points out that Indiana had the second largest boost last year, 1,276,500 tons. Other major increases included Illinois with 1,079,600 tons, Michigan with 744,800 tons, Pennsylvania with 685,900 tons, Texas with 520,180 tons, Alabama with 376,000 tons, Maryland with 350,000 tons, New York with 254,830 tons and Utah with 240,000 tons.

A Look at Plastics

Watch for more steel pipe producers to get into the plastic pipe field. Youngstown Sheet & Tube Co. reports full production has started at Sand Springs, Okla., by Fibercast Corp. in which it has an interest. Republic Steel Corp.'s Owings-Sharpe Inc., which it purchased last year, is getting rolling. Joseph T. Ryerson & Son Inc., steel service firm, is now distributing plastic pipe and fittings produced by Carlon Products Corp., Cleveland.

End of Subsidies?

Look for curtailment in all direct and indirect U.S. subsidies to European capital goods producers. The situation is particularly acute in the machine tool field. In Western Germany, for example, U.S. assistance has

The Technical Outlook—p. 87 The Market Outlook—p. 143

contributed to a situation where more than 1000 builders are now in business. Less than half that many operate in the U.S.

The Long View on Trade

Discount some of the talk current that the report by the Randall Commission on Foreign Economic Policy will languish through congressional inaction (p. 55). Some of the recommendations for incentives on foreign investments have already been suggested by the President and favorably commented upon by leading legislators. The White House will push hard for the tariff proposals, too. . . . Commission Chairman Clarence B. Randall is being retained, now that his commission's job is done, as special presidential adviser.

Trouble in Taxes

Tighter administration of our labor laws is in the offing, although the possibility of any important changes in the statutes grows steadily dimmer. The Eisenhower proposal for a secret strike vote has been virtually killed. More objective administration of the laws is promised through Republican control of the National Labor Relations Board. Late last week it appeared almost certain that Albert C. Beeson, California businessman, would be confirmed by the Senate as a member of NLRB, to give the Republicans clear control of the board for the first time in nearly two decades.

Tighter Labor Law Control?

A fierce fight is brewing in Congress over whether to reduce corporate taxes from the present 52 per cent rate to 47. Ways & Means Chairman Dan Reed (Rep., N.Y.) favors the cut, but other party members, notably Speaker Joseph Martin (Rep., Mass.), oppose him.

Straws in the Wind

U.S. Steel Corp. is opening a rail-river route to get coal to Chicago from the South . . . Only 500,000 of 4.5 million British steel company shares were taken by the public in the second Tory denationalization step . . . International Brotherhood of Teamsters has bought about $1 million worth of Fruehauf Trailer Co. common . . . Molybdenum is now plentiful after a 3-year shortage, says Climax Molybdenum Co. . . . Electric utilities will add a record 12.5 million kilowatts to generating capacity in 1954.

This Week in Metalworking

Nearly one out of four steel, copper and aluminum buyers are shifting to at least one new source of supply (p. 45) . . . Pittsburgh area steel companies plan to step up barge shipments on the Ohio river (p. 47) . . . Gray iron foundrymen sense an order upturn (p. 48) . . . Even if unemployment averages 3 million this year, the ratio to the work force will compare favorably with that of recent years and will be far better than the best prewar conditions (p. 49) . . . Steel companies had record sales in 1953, but earnings lagged (p. 50).

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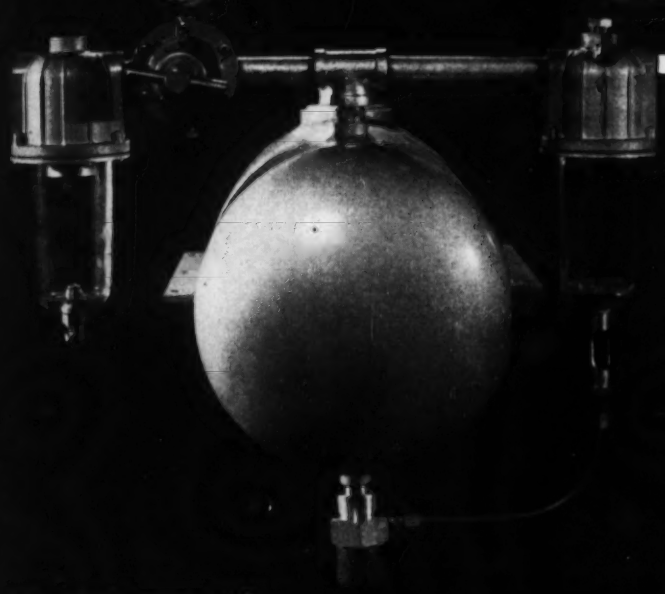

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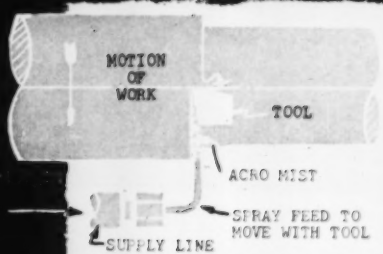

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Product Purity and sterility are easy to maintain in this metering pump, because head and inlet and outlet fittings are constructed of Type 303 chromium-nickel stainless steel. Maisch Metering Pumps are built by Mechanical Products Corp., Chicago 7, Ill.

An example of Corrosion Resistance ...and maintenance of accuracy... provided by Type 303 Stainless

Manufacturers of equipment designed to protect product purity and assure sanitation find it pays to use chromium-nickel stainless steel for corrosion resistance and other money-saving properties.

For instance, the makers of Maisch metering pumps . . . widely used for precise dispensing in biological and industrial fields . . . specify Type 303 Stainless. They fabricate pump heads and inlet and outlet fittings from Type 303 to provide properties that help users maintain product purity, sterility and sanitation, as well as permanent accuracy under very diverse service conditions.

Type 303 is the free-machining grade of the austenitic chromium-nickel stainless steels which are immune to most organic and a great many inorganic chemicals.

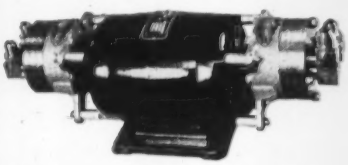
INCO

This improved machinability, combined with resistance to galling and seizing, make Type 303 stainless particularly useful for gears, heads, fittings and other machined products.

You can also trim bulk and deadweight by using correct types of chromium-nickel stainless. They are strong yet tough, and also resistant to wear and abrasion. At elevated temperatures they resist creep, scaling and oxidation, while at low temperatures they offer exceptional resistance to impact.

Investigate all the economies you can obtain by using stainless steel for your products or equipment. Send us your inquiries on the use of cast or wrought stainless alloy steels containing nickel, and details of your problems for our suggestions.

Chromium-Nickel Stainless Steel Type 303 . . . and precision construction . . . contribute to the permanent accuracy of this biological metering pump. Maisch pumps are adjustable, and permit dispensing from 0 to 9,000 cubic centimeters per minute.



Sanitation in dispensing hot or cold, viscous or non-viscous liquids is advanced by use of Type 303 stainless. Maisch industrial pumps are available, single or duplex, with fixed capacities from 10 to 290 gph.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

Too Much Quibbling

Discussion on two current events shows how widely public opinion is divided on important national issues. One is the report of the President's Commission on Foreign Economic Policy, of which Clarence B. Randall of Inland Steel Co. is chairman. The other is the heated debate over the so-called Bricker amendment, the intent of which is to prevent treaties from superseding domestic law.

Many of the arguments over these issues of how our nation shall deal with other nations indicate that a considerable number of debaters take the stand that their view is the only right one and that all who oppose this view are wrong. To these people everything is black or white; there is no such thing as a gray hue.

Unfortunately these stubborn few have sufficient influence to make it difficult to negotiate compromises. Nevertheless, agreements will be worked out eventually in spite of their opposition. Foreign trade policy will follow in the general direction recommended by the Randall commission. The President will retain a large area of freedom in the negotiation of treaties, but at the same time restraints will be imposed that will prevent a treaty from taking precedence over our constitution.

Therefore, the immediate problem is to facilitate the working out of compromises that will lead to these desired results. In his book *Creed for Free Enterprise*, Mr. Randall states a formula that would seem to fit this problem: "In most situations there are half a dozen possible plans proposed, any one of which would work reasonably well, and it is far more important to select one and get on with the job than it is to prolong the debate until the last shred of doubt as to which is the perfect best can be removed."

Admittedly there may not be "half a dozen plans" for foreign trade policy or for safeguarding of domestic law against treaties that "would work reasonably well." However, there certainly are ways to yield on minor points in order to gain on more important ones. It should be possible to arrive at the desirable solutions for both of these major problems without undue quibbling.

E. C. Shaner

EDITOR-IN-CHIEF

QUESTION AND ANSWER: Last Tuesday David Sarnoff, chairman of Radio Corp. of America, demonstrated a tiny atomic battery in which atomic energy is converted directly into electricity. Each electron radiating from a wafer of strontium-90 bombards a wafer of

silicon crystal and thereby liberates several hundred thousand silicon electrons. The resultant currents of positive and negative charged electrons produce a flow of electricity.

In Mr. Sarnoff's demonstration, the small fraction of a watt of electric power generated was hooked up to a telephone amplifier and a telegraph key was cut into the circuit. Sarnoff, a telegrapher in his early days, tapped out this message, "Man is still the greatest miracle and the greatest problem on this earth."

On May 24, 1844, Samuel F. B. Morse, sitting in the courtroom of the United States Supreme Court in Washington, sent the world's first telegraph message to a station in Baltimore. The message was "What hath God wrought!" Is not Mr. Sarnoff's statement that man is the world's greatest miracle and its greatest problem an exceedingly apt answer to Mr. Morse's 110-year-old question?

* * *

LABS IN THE SUBURBS: A year or more ago, Diamond Alkali Co. purchased acreage in a rapidly growing suburban city in the eastern part of metropolitan Cleveland and asked permission of the city council to erect a research laboratory in a rather attractive campus-type setting. The citizens were burdened with one of the highest tax rates in the county, and the prospect that an industrial corporation might carry part of the tax burden was attractive. Nevertheless, citizens who apparently could not recognize the difference between a laboratory and a smoke-engulfed establishment succeeded in blocking the deal.

Recently in a western suburb of Cleveland, Union Carbide & Carbon Corp. has sought a change in zoning laws to permit it to build a research laboratory on acreage now occupied by a golf course. Here again, one group of citizens took early initiative to block the move. Fortunately, wiser heads came into the picture, and it now looks as if Union Carbide will be welcomed with open arms by a heavy majority of the suburb's citizens.

* * *

IT'S NOT DIRT, SMOKE: We think this problem of the attitude of citizens toward an industrial company desiring to have zoning laws modified to permit it to establish an attractive plant, laboratory or other facility deserves much more attention than has been accorded it to date. There are thousands of communities in the United States where the advent of a clean-cut industrial operation into a non-industrial environment would be a blessing in many ways.

One of the troubles is that many citizens do not know enough about industry to realize that not all of industry is dirty, smoky, smelly and undesirable. It would be wonderful if citizens who are automatically opposed to industry could see some of the modern small-town or suburban industrial centers where heights of buildings are limited, setback regulations are enforced religiously and landscaping approaches the attractiveness of a college campus.

* * *

OFFERS SOCIAL GAINS: Citizens of a community in which an industrial concern is planning to establish a plant, laboratory or other facility have every right to be suspicious. However, it is true in most cases that local prejudices against industry are founded on experiences of a decade or more ago.

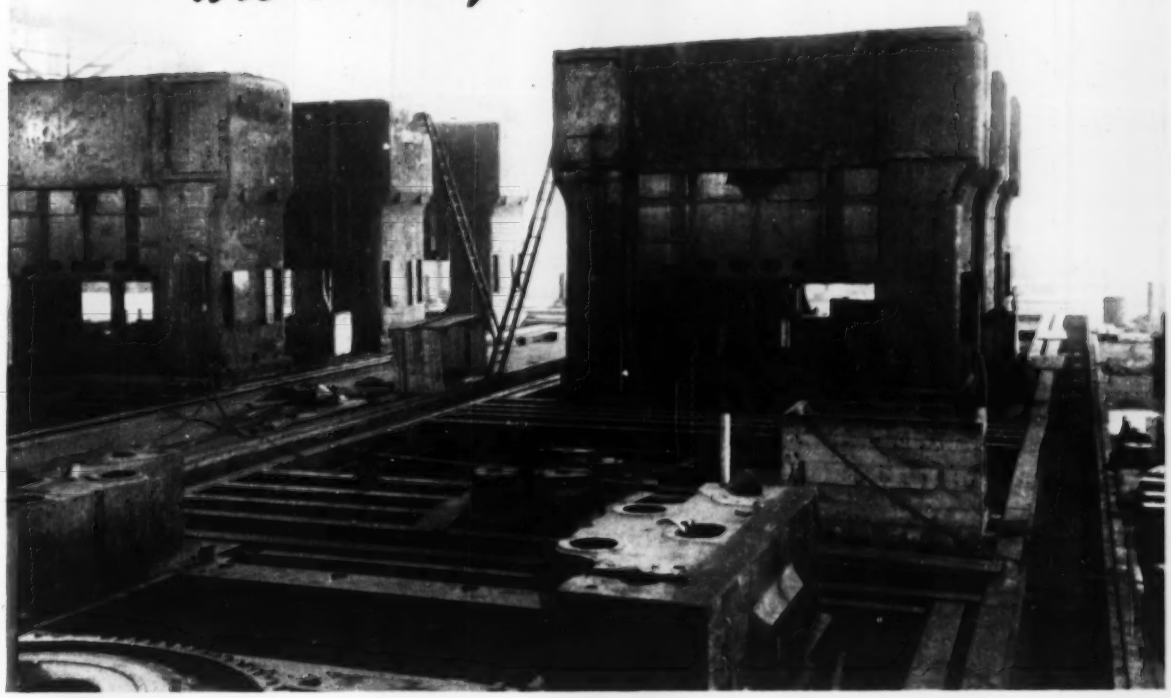
As of today, there are new and attractive challenges to the citizens of a community where a well-established company wishes to construct a laboratory. The company will pay taxes that will ease the burden of citizens. Its employees —largely professional personnel and technicians —will be a decided asset to the community. If you happen to live in one of these communities where the professionals of a growing industry are prominent in the local social life, you know that the advent of the laboratory, plant or other facility which brings these people into the community is a great blessing.

* * *

NOT TOO BAD . . . YET! No reasonable person should resent the anxiety that surrounds the problem of unemployment. Right now we are supposed to have an average labor force of 62,600,000 persons, of whom about 2 million or 3.2 per cent are unemployed. Prior to 1950 and extending back to the terrible depression years of the thirties (p. 49) unemployment exceeded the current figure by large margins except in the peak wartime years of 1943, 1944 and 1945.

As against occasional reports of persons laid off or furloughed, we have some encouraging reports. Gray iron foundry and machine tool builders' orders (pp. 48, 49) are up from previous levels.

These presses are costing their owner money!



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The Commercial Contracting Corporation staff knows from experience that reducing the estimated time required to install a big press or a machine tool by a week or even a day is appreciated.

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Whether your project is large or small, every aspect of the work will be supervised by experts, expedited by top management.

Why not call in the CCC industrial team to handle your own plant expansion or alteration program? You will be gratified with the results.

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Structural Shapes • Bars • Tin Mill Products
Rails and Track Accessories • Coal Chemicals

Metal Buyers Switch Suppliers

One out of four changes at least one source of supply in a search for better deals, lower freight costs, improved service. Even more inventory cuts are in the offing

NEARLY ONE-FOURTH of steel, aluminum and copper buyers are switching to at least one new source of supply.

That's revealed in STEEL's latest quarterly survey of purchasing trends in the three major metals. About 23 per cent of the buyers say they are trying new suppliers —perhaps keeping two of their old sources, but switching on a third. Most of the shifts are from one warehouse to another.

Background—The moving around indicates purchasing agents are trying for better deals, lower freight costs, improved service. Consumers are steadily gaining more control of the buying situation, and inventories of all three metals—but particularly steel—are dropping (see table p. 46).

Some 76 per cent of the survey's participants say they will cut stocks still more in the next three months. About one-fourth of the respondents say inventories are satisfactory now.

Larger Stocks Wanted—Stocks of only six products have been enlarged, all others have been cut. Items with larger inventories are hot-rolled carbon bars under one inch, galvanized sheets, light and heavy plates, seamless tubing and copper and brass mill products.

Among the 17 metal products being inventoried in smaller quantities on a national average, five products showed significant regional variations. Those five generally have the highest stocks in the West, the lowest in the East. Midwestern inventories are in between, but still lower than they were three months age. The five products: Hot-rolled carbon bars over one inch, cold-finished bars both over and under one inch, hot-rolled sheets, strip and standard structural shapes.

Causing Inventory Trouble—Respondents say they have the most trouble keeping proper stocks of cold-finished bars over one inch and standard structural shapes. Several buyers report that difficulties in wide flange structurals still exist, but that they're easing fast.

Deliveries on all products but one, light plates, are faster now than three months ago. But even in light plates supplies are adequate. Only 1 per cent of the respondents use foreign sources, continuing the steady decline from past quarters.

Steel Capacity: Up in '54

Steel industry plans a $775-million expansion, improvement program this year

MORE CAPACITY, better working conditions, more jobs—the nation's iron and steel industry estimates it'll spend $775 million in 1954 to further these three objectives.

Total investment of more than $1 billion spent last year for expansion and plant improvement was the third largest in history, American Iron & Steel Institute reports. The expenditure brought the 8-year postwar investment total to more than $5.6 billion.

Private Financing—"Nearly all of the expansion and improvement has been privately financed," says the AISI, "and the total postwar outlay exceeds the total investment of the entire industry eight years ago."

Facilities added in 1953 included about 500 new coke ovens, over 400 rebuilt coke ovens, several new blast furnaces, steelmaking furnaces, soaking pits, sheet rolling equipment, a new seamless tube mill, strip and tin plate facilities, a bar mill, annealing and other equipment.

Participants—AISI also points out that the investment in 1954 is not being made by merely one or a few large companies alone. Medium and small size companies are sharing in the expansion and improvement program too.

Bridgeport Readies Plant

Aluminum extrusion and forging operations at the Adrian, Mich., plant leased from the Air Force will begin about Feb. 15, says Herman W. Steinkraus, president, Bridgeport Brass Co.

With a potential production capacity of $50 million to $60 mil-

Latest Metal Supply Picture as Seen by STEEL's Quarterly Survey

(Figures are percentages of those replying to the questionnaire)

COMPONENTS	INVENTORY POSITION					BEST DELIVERY				
	Under 10 days	10-30 days	30-60 days	60-90 days	3-6 mos.	Under 10 days	10-30 days	30-60 days	60-90 days	3-6 mos.
C. F. bars, over 1" (This quarter))	10	21	31	31	7	20	56	16	8	
(Last quarter)		31	39	15	15	20	50	10		20
C. F. bars, under 1"	8	20	36	24	12	14	59	23		4
		42	33	25		27	37	27	9	
H. R. alloy bars	10	19	57	14		18	53	29		
			33	45	22	13	26	12	37	12
H. R. carbon bars, over 1"	5	23	46	16	10	18	24	49	6	3
		23	54	9	14	32	27	27	9	5
H. R. carbon bars under 1"	3	15	45	25	12	22	27	41	5	5
		19	54	23	4	17	35	31	13	4
H. R. sheets, strip	5	18	50	16	11	6	29	52	10	3
		30	25	30	15	10	20	40	25	5
C. R. sheets, strip	9	15	40	18	18	10	22	55	13	
		7	57	36			7	40	53	
Galvanized sheets	22	5	28	28	17	29	24	41	6	
		43	29	14	14	29	14	57		
Plates, light	3	22	34	33	8	13	33	33	14	7
		24	47	23	6	19	38	25	12	6
Plates, heavy	3	16	42	32	7	8	27	38	15	12
		21	43	29	7	9	8	58	17	8
Structural shapes	7	33	23	27	10	11	25	26	21	7
	6	19	50	25		6	25	19	25	25
Welded tubing	11	17	39	28	5	29	21	43	7	
			67	22	11	15	14	57	14	
Seamless tubing	4	23	32	23	18	21	32	37	10	
	13	38	25	12	12	50		17	33	
Stainless sheets, strip	20	20	40	20		7	50	43		
	9	18	55	18			46	18	36	
Pig iron (foundry)	18	9	64	9		11	89			
			50	38	12		57	29	14	
Copper, brass mill prod.	6	13	50	19	12	21	36	29	14	
		25	50	13	12	11	45	33	11	
Aluminum products	5	35	50	10		11	45	44		
		18	37	36	9	18	28	27	27	

lion annually, the plant contains 16 extrusion presses and a number of forging presses. Present plans call for most production of both forging and extrusion presses to go to the Air Force, with civilian work going on idle capacity as it develops. The equipment at the Adrian, Mich., plant is also suitable for working titanium and other metals which the firm plans to undertake.

Ceramics Outlook Bright

"By 1960 ceramics plants will be coating 97 per cent of all exposed steel parts produced in the country to save on the $6-billion annual cost of corrosion." That was the prediction of Robert A. Weaver Jr., president, Bettinger Corp., Waltham, Mass., before a conference of the American Ceramic Society in New York on Jan. 15.

Mr. Weaver also estimated 85 per cent of commercial aircraft will be using heat-resistant ceramic coatings within two years.

Luria Bros. Faces FTC Action

Luria Brothers & Co. Inc., Philadelphia, is the respondent in a Federal Trade Commission complaint issued against alleged monopolistic practices in iron and steel scrap dealings. Southwest Steel Corp., Pittsburgh, which is owned and controlled by Luria, is also named. Sixteen iron and steel producers are charged with joining the combination and conspiracy to substantially restrain and suppress competition in scrap.

Luria, in addition, is charged with violation of the antimerger section of the Clayton Antitrust Act through acquisition since 1946 of all or a substantial part of the capital stock of six other corporations. Hearings on the case will start in Philadelphia on Apr. 5.

Iron and steel producers named in the complaint are:

Granite City Steel Co., United States Steel Corp., Colorado Fuel & Iron Corp. and its subsidiary John A. Roebling's Sons Co., Central Iron & Steel Co. and its subsidiary Phoenix Iron & Steel Co., Lukens Steel Co., Weirton Steel Co., McLouth Steel Corp., Detroit Steel Corp., Bucyrus-Erie Co., Baldwin-Lima-Hamilton Corp., Edgewater Steel Co., Columbia Malleable Castings Corp. and Boiardi Steel Corp., which is now Milton Steel Products Division of Merritt-Chapman & Scott Corp.

Jones & Laughlin

Ohio River Traffic Barges Ahead

Shipping by barge on the Ohio-Mississippi river system more than tripled in ton-miles from 1939 to 1952. Steel companies show special interest in the cheaper freight costs

STEADY GROWTH from 3.4 billion ton-miles in 1939 to 10.4 billion ton-miles in 1952 that's the story of Ohio river traffic as charted by the Army Corps of Engineers. Illustrating increasing use of the river by industry, Army engineers say 56 million tons of cargo were hauled on average trips of 185 miles on the Ohio in 1952. This compares with hauls of 48.6 million tons in 1950 and about 26 million tons in 1939.

"If barges are any thicker this year we'll have to install traffic lights on the rivers," joked an engineer in Wheeling, W. Va., last week. He spoke as shippers prepared for another record-breaking year of freight hauling on inland waterways.

Barge Count — Army engineers counted 40,070 barges passing a point six miles downstream from Pittsburgh in the first ten months of 1953. That's a 22.5 per cent increase from the traffic count in 1952, indicating a new annual record for river shipments.

Industrial expansion in the Southwest, new plants along inland waterways and inexpensive freight costs are three major reasons why steelmakers are shipping a greater proportion of their products by barge. "In 1946 we shipped 8 per cent of our output downstream," a traffic manager for a steel company in Pittsburgh comments. "Now we ship 12 per cent of our products on the river, and we expect to increase that percentage soon."

Shipments Grow — "In December, 1953, we sent the unprecedented total (for December) of nine barge shipments down the Ohio river," says Ken Maxey, public relations director for Pittsburgh Steel Co., Pittsburgh. Jones & Laughlin Steel Corp., Pittsburgh, opened warehouses in Nashville, Tenn., on the Cumberland river, and in Louisville, Ky., on the Ohio, in the last half of 1953. So, J&L has further plans for expansion along the waterways.

"Our sheet is more competitive in Houston than in Columbus, O.," a sales manager in the Pittsburgh district comments, explaining his company's growing interest in river shipments. Army engineers say tonnage of iron and steel shipments on the Ohio is surpassed by tonnage of coal and coke, oil and gasoline, sand, stone and gravel. Steel's total is rising, from 971,600 tons in 1946 to 2.4 million tons in 1952.

Shipping Plans—New shipping practices are taking shape on the Ohio-Mississippi river system. Steelmakers are "pooling" customers in a certain area, delivering combination loads of various steel products to a centrally-located public dock.

Barge shipments are now scheduled at regular intervals by steelmakers. Fabricators on the lower Mississippi, instead of storing 30-day inventories of sheet in their warehouses, may keep only a 10-day stock, knowing that a 20-day supply will arrive in one week. Thus fabricators have a "floating inventory" of sheet, requiring no maintenance or storage costs.

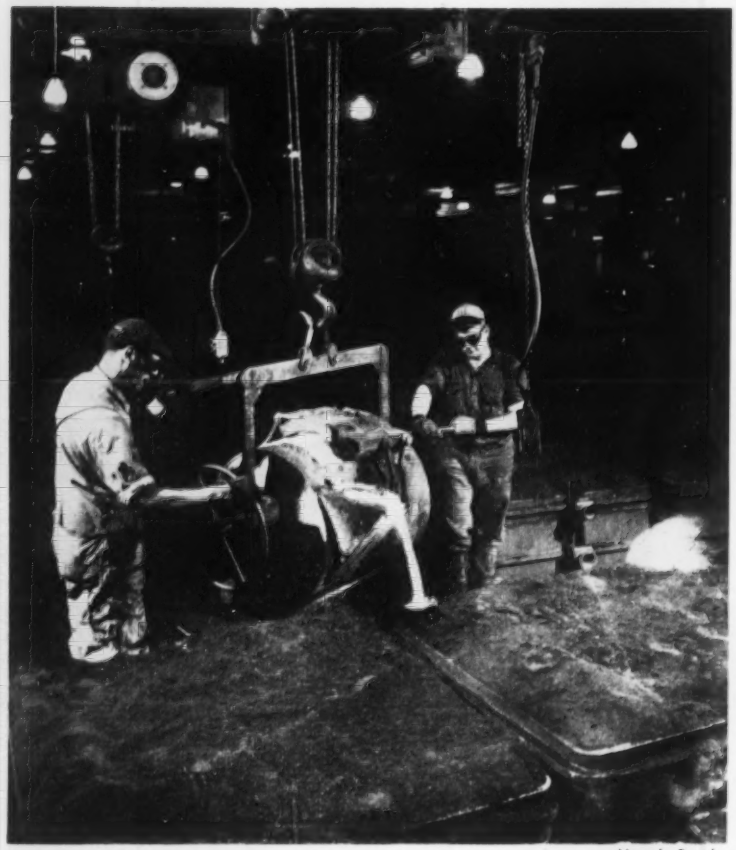
Barge Building — More river shipments means greater activity at such shipyards as those of Dravo Corp., Pittsburgh. At the beginning of 1953 Dravo had orders for 135 vessels. During that year Dravo launched 112 boats of various types at Pittsburgh and Wilmington, Del., yards. Most were hopper barges for transporting coal, steel and other commodities.

Dravo expects shipbuilding activities will continue to grow this year, sparked by industrial expansion along the Ohio river. And that will mean business for steelmakers. Dravo points out that the average 175-foot hopper barge requires about 150 tons of steel.

Shipbuilding Far from Peak

U. S. shipyards employed 1.7 million workers at the peak of World War II compared with employment of 122,900 late last year.

Those were the figures cited by the American Boat Builders and Repairers Association Inc. in protest to the government's Mutual Defense Assistance Program which spends U. S. dollars in European shipyards. Under MDAP, sea-going defense ships are being built in foreign yards where labor and materials costs are lower than in the U. S. But American builders say that program may lead foreign shipbuilders to enter the field of building and repairing recreational craft in competition with U. S. builders and repairers. This, they say, might signal the end of the American shipbuilding industry.



Neenah Foundry

Order Upturn Noted in Gray Iron Castings

There's optimism in the industry that the inventory adjustment may be about over. Outlook for 1954 is good, but cost-cutting will be emphasized

BRIGHTER PROSPECTS are beginning to form on the gray iron foundry market. A definite order increase in light and medium castings was reported last week by the Gray Iron Founders' Society Inc. and this engendered the feeling by many that the "inventory adjustment may be about over."

For industry in general, the castings order upturn is a cheerful sign; increased activity on the foundry front generally presages an upturn in other metalworking business.

Forecast — Good — Outlook for 1954 is also good. Deepest production cut expected this year is 10 per cent. Many think that production will be near 12 million tons, only slightly less than 1953's 12.5 million tons (see table).

Current operations are spotty and reflect the gradual decline which began in mid-1953 and only now shows signs of reversing. A STEEL check of foundries in the large industrial areas reveals some curtailment of labor forces, some four-day operations, but no general pessimism.

Spotty Activity—Foundries serving the automotive field are not up to year-ago levels, although some are already back to "normal operations." More activity is being shown in the appliance and machine tool industries than in the final quarter of last year, but things are comparatively slow in those foundries serving the steel mills. Hardest hit, however, are the foundries supplying textile and agricultural equipment industries, the society reports.

Continued high-level activity in air conditioner sales, the oil industry and construction provides good prospects for the foundries serving those industries.

Quicker Delivery—Backlogs, too, vary from company to company, with the average being from four to six weeks compared with 60 to 90 days a year ago. Postwar expansion has given the gray iron founders a capacity of an estimated 22 million tons, so little expansion is expected this year.

But there will be some capital expenditures, particularly for such things as smoke control. Rosedale Foundry & Machine Co., Pittsburgh, says it will invest in smoke control devices even though sales are low. "Under county law we have to have control devices in operation by June 1," Harold Gassner, vice president, says.

The Emphasis—Saleswise, most foundries expect to have to work harder in 1954. No new competitors are expected in the industry, but more salesmen will be out in the field stressing faster deliveries and better quality products. "Probably the most important factor this year," says a Midwest foundry executive whose company has trimmed its workforce 20 per cent, "will be to cut costs— all of them, wherever possible."

Gray Iron Castings Output

(millions of tons)

1953*	12.5
1952	12.8
1951	15.0
1950	12.9
1949	10.5

Source—Gray Iron Founders Society Inc.
* Estimated

King-Size Railroad Cars Ordered

Orders for 16 new double-deck suburban cars with largest seating capacity of any railroad equipment in the country have been ordered by the Chicago & North Western Railway from the St. Louis Car Co. Approximate cost of the cars is $2.2 million and delivery is scheduled for the latter part of this

year, Paul E. Feucht, C&NWR president, says.

The new cars will have a seating capacity of 169 people and are being built for operation at speeds up to 80 miles per hour. Cars will be independent of the locomotive and of each other as to lighting and air conditioning. Pneumatic sliding doors will permit loading and unloading of three persons at a time, and each car will have a lavatory with wash basin and running water.

Metal Marking Studied

Marking of semifinished metal products by composition is being studied by Office of Defense Mobilization. Such marking, says ODM, would simplify the sorting of inventories after an enemy attack.

ODM recently raised the question at a meeting of the Aluminum Industry Advisory Committee of the Business & Defense Services Administration. The aluminum industry has been marking its products where the buyer called for such marking over the past few years. ODM says it plans to discuss marking of steel products at an early meeting of the BDSA Steel Products Industry Advisory Committee.

Fabricators Optimistic for '54

Steel plate fabricators reported average backlogs of orders ranging up to four and five months when they gathered for the 21st annual meeting of the Steel Plate Fabricators Association in Chicago. And there is optimism in the industry that volume of business this year will compare favorably with 1953, even though shops serving the petroleum industry are expressing some concern as to future commitments.

While steel shortage is not a big problem with the fabricators anymore, some reported they are still unable to obtain heavy and wide plates and wide flange beams in quantities they would like.

Re-elected as officers of the association are: President Robert J. Ryan, president, Nooter Corp., St. Louis; vice president H. D. Skyrm, vice president, General American Transportation Corp., Chicago; treasurer William S. Wheeler, president, Pennsylvania Engineering Corp., New Castle, Pa.; and secretary J. Dwight Evans, Chicago.

Unemployment: When Alarming?

	Av. monthly labor force	Av. monthly unemployed	Per cent unemployed
Jan. 1954	62,600,000*	2,000,000*	3.2*
1953	63,487,000*	1,443,000*	2.3*
1952	62,966,000	1,673,000	2.7
1951	62,884,000	1,879,000	3.0
1950	63,099,000	3,142,000	5.0
1949	62,105,000	3,395,000	5.4
1948	61,442,000	2,064,000	3.3
1947	60,168,000	2,142,000	3.5
1946	57,520,000	2,270,000	3.9
1945	53,860,000	1,040,000	1.9
1944	54,630,000	670,000	1.2
1943	55,540,000	1,070,000	1.9
1942	56,410,000	2,660,000	4.7
1941	55,910,000	5,560,000	9.9
1940	55,640,000	8,120,000	14.5
1939	55,230,000	9,480,000	17.1
1938	54,610,000	10,390,000	19.0

Source: U. S. Departments of Commerce and Labor
* Estimated

HOW HIGH does unemployment have to go before it's considered alarming? Today's estimated 2-million-plus figure (see table) is one of the lowest in the postwar years. Economists predict that joblessness could average 3 million per month in 1954. Even so, the ratio of unemployment to the labor force still will be somewhat better than in 1949-50 and far better than in 1940-41.

Machine Tool Order Rate Climbs

The rate of new orders for machine tools in December and January has taken an upswing, adding more support to the belief that the inventory adjustment may be about over (see p. 48). National Machine Tool Builders' Association says December's $44 million in orders is a 1.5 per cent increase over November.

Although this is 35 per cent below the December, 1952, order total, tool builders report also that cancellations have dropped sharply. Brightening the industry's outlook, too, are the elimination of excess profits tax, which should make more money available for tools, and the prospects for more favorable depreciation legislation this year.

Leasing on the Increase

Leasing and time-payment purchases of materials handling equipment increased considerably during the last half of 1953, reports Yale & Towne Mfg. Co.

Much of the increase is attributed to Yale's company-developed, three-way financing plan. That allows for time-payment purchases, leasing or leasing with a purchase option. "Manufacturers . . . can put complete modern materials handling systems into operation at once . . . savings in operating costs can then be utilized in paying off the cost of the equipment," says Elmer F. Twyman, Yale vice president. "We believe it is opening the way for a new type of merchandising in our industry."

1954: Pay Problems Ahead

All employees—executives to production-workers — must be considered in pay planning

WAGES AND SALARIES — top management can expect plenty of headaches in this area in 1954.

What's the outlook? Business Reports Inc., New York, in study just published, "1954 Pay Almanac," expects: Wage hikes of 3 to 6 cents per hour, bigger push for welfare benefits, rumblings but no action until 1955 on guaranteed annual pay, increased restlessness in the middle income employee group and continued scarcity of key personnel.

Greatest Activity—Pensions, insurance plans and similar fringe benefits granted by pace-setter companies in 1953 will probably affect more businesses in 1954 than any other development, BR's study shows. Both auto firms which haven't already done so and steel companies can expect to sign for a $150 monthly pension figure, says BR. Smaller companies will be faced more and more with providing benefits comparable to the industry giants.

Unions are retreating somewhat from the guaranteed annual pay conception and are talking now more in terms of a trust fund. Much like a pension fund, the new fund is one to which management contributes so that employees may be paid a certain percentage (65 to 70 per cent) of their regular earnings during any time they are unemployed. BR cautions management to be sure its liability is limited to the extent of the fund, to make all agreements cancellable on notice, to limit employee's protection to one year at most and to hang on to normal management prerogatives.

A Closing Gap—The decreasing pay differential between wage earners and salaried employees will create the unrest in the middle income group, according to the study. Imaginative firms will try ideas such as longer vacations, scholarship funds for employees' children, more generous expense accounts and other nonpay inducements to solve the problem. Emphasized is the fact that with the return of today's buyers' market the trained talent of the administrative, supervisory, technical and sales personnel may make the difference between profit and loss for many companies this year.

Emphasis in the executive field will be on finding ways to increase the official's after-tax income with a minimum cost to the company. Stock options, profit sharing, bonuses, pensions and insurance plans will get more attention this year.

NLRB: Busy in 1953

How much activity is there on the nation's labor front in a year? To get some idea, take a look at the five-member National Labor Relations Board's tally for the fiscal year ended June 30, 1953.

The board issued decisions in 3053 cases over law and 526 cases of unfair labor practices; it closed 5103 unfair labor practice cases without formal action, issued 950 formal complaints of law violations and closed 5868 unfair labor practice cases with formal action.

The board conducted 6191 representation elections. American Federation of Labor won rights in 2773 out of 4375 elections, Congress of Industrial Organizations won 1132 out of 2186 and unaffiliated unions won 489 out of 815 elections.

Included in the achievements of the board were reductions in processing time—collective bargaining election processing from previous low of 90 days to 60 days and unfair labor practice case processing from 447 days to 350 days.

Steel Earnings: High, but Still Lagging

EARNINGS of the steel industry in 1953 made a strong comeback from strike-riddled 1952, as seen in the selected figures below, and in some cases even pushed close to record levels despite the excess profits tax.

For instance, U. S. Steel Corp., which has just less than a third of the total steelmaking capacity of the nation, in 1953 had the highest earnings since the World War I period. However, in 1917, the corporation shipped only 16.9 million tons of steel products in marking up earnings of $224.2 million, while shipments this year hit a record at 25.1 million tons.

Republic, Too — Republic Steel Corp. reports the second best profit picture in its history, taking back seat only to 1950 when the company earned about $63.8 million. However, steel ingot production last year was at a record 9.6 million tons. The story is similar for other producers greater production than ever, but profits not proportionally higher.

Still others were not as well off this year as in 1951. Wheeling Steel Corp. fell below that level by nearly $5 million, and Inland Steel Co. in 1953 showed a shade less strength in the profit column, than in 1951. Inland reports record sales of $579.5 million.

Other Records—Sales and production were not the only records in general evidence in the preliminary annual reports. It looks like the steel industry will pay a record total to Uncle Sam in the form of both income and excess profits taxes.

Kaiser Steel Corp., whose fiscal year is only half over, reports net earnings amounted to $3,835,619 for the six months ended Dec. 31, 1953, compared with $3,623,657 for the same period the year before. Colorado Fuel & Iron Corp. reports profits for the same period as $4,864,505 in the 1953 months compared with $2,604,146 in the same span in 1952.

Annual Earnings of Selected Steel Producers

	1953	1952	1951
U. S. Steel Corp.	$222,735,656	$143,687,746	$184,359,787
Bethlehem Steel Corp.	133,947,837	90,900,771	106,531,293
Republic Corp.	56,743,547	44,271,053	54,921,541
Inland Steel Co.	33,867,184	23,755,218	34,398,585
Jones & Laughlin Steel Corp.	31,015,000	19,482,000	30,998,000
Youngstown Sheet & Tube Co.	30,839,716	22,915,822	30,644,201
Wheeling Steel Corp.	12,458,311	10,950,780	17,392,959
Lukens Steel Co.*	3,607,713	2,316,791	3,549,567

* Fiscal year ended Oct. 24, 1953.

Formula for Furnaces

Makers of the industrial units plan to keep sales hot by stress on modernization, costs

SELL MODERNIZATION. That's the theme of builders of industrial furnaces and combustion equipment in going all-out for business in 1954.

Meeting at Philadelphia Jan. 25-26, members of the Industrial Furnace Manufacturers Association laid aggressive publicity and promotion plans designed to avoid a dip in sales from the high levels of 1953.

Optimism—The group did $68 million worth of business in 1953, and the IFMA new order index stood at 226 per cent of the 1945-47 average. In 1954, IFMA members expect to keep the index at close to the 1953 level by urging industry to buy modern, cost-cutting equipment.

As pointed out by L. H. Gillette, newly elected IFMA president and manager of industrial heating sales, Westinghouse Electric Corp., the furnace market in 1954 will be transitory from that of the plant expansion period to one consisting mostly of the replacement of obsolete equipment.

Some Expansion — "You'll find business in 1954 better than anticipated," he said. Mr. Gillette also looks for a considerable amount of furnace business as part of the 25-per-cent expansion in metalworking capacity expected between now and 1960.

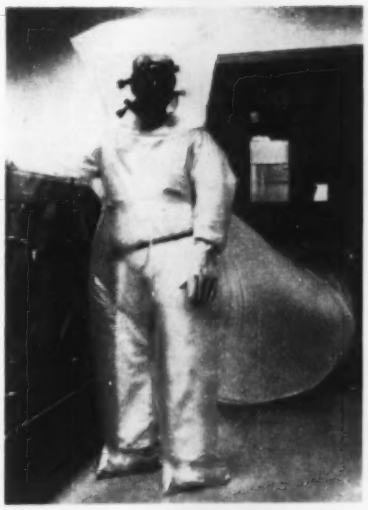
Another factor favorably affecting sales in the estimation of Carl Ipsen, IFMA executive vice president, is that industry now is doing more heat treating in relation to other metalworking processes than it did in the 1946-49 period.

Case History — Furnace builders say that developments in industrial heating have been coming along so fast in the last decade that there's many an untold success story that will help boost sales. For instance, one open-hearth shop is making an additional 100,000 tons of steel a year by installing an improved combustion system and without increasing the size of furnaces. And, there's the gear manufacturer with a new $500,000 heat-treating department producing more gears of higher quality and longer service life.

Industry is demanding higher standards for machinability, hardness, durability, surface finish and other qualities, often with lower cost materials. Furnacemen report physical properties heretofore thought impossible can be achieved with the precision furnace equipment now available.

Evolution—Technologically, this equipment bears little resemblance to that of a few years ago. Furnace structures and insulating materials have been improved and developments have been coming up in rapid-fire order in controlled atmospheres, salt baths and quenching medium. Automation, too, has invaded the furnace field. Precision control instruments and built-in handling devices make heating and heat-treating cycles practically automatic.

Mr. Gillette succeeds C. H. Vaughan, sales manager, Electric Furnace Co., Salem, O., as president. New vice president is Horace Drever, president, Drever Co., Philadelphia; secretary, R. E. Whittaker, secretary, Swindell-Dressler Corp., Pittsburgh. New directors are: Norman H. Davies, president, North American Mfg. Co., Cleveland, Mr. Drever and Mr. Gillette.



For Radiation, not Rockets

Plastic "space" suits provide protection against radiation in "hot" areas at the Richland, Wash., plutonium-producing plant operated by GE for AEC

Organized Upkeep

It pays big dividends, industrymen learn at the fifth plant maintenance show

INDUSTRY'S learning how to get more out of the $20 billion it will spend on maintenance in 1954.

About 20,000 persons whose job it is to keep equipment running and facilities in top shape attended the fifth plant maintenance show at Chicago's International Amphitheatre last week.

Better Mix—For one thing, exhibitors noted more plant managers and purchasing agents in attendance this year than is usual.

Several firms had testimonials to the advantages of systematizing maintenance rather than relying on spot repairs. O. W. Gravely, works engineer at Electro Metallurgical Co., division of Union Carbide & Carbon Corp., gave one example. Output of a single coke drying system at Electro-Met rose from 65,000 tons to 100,000 tons a year while upkeep dropped from $2000 to $1600 a month after a regular program of maintenance was instituted.

Look at Labor—Another firm discovered 46 per cent of its maintenance craftsmen spent their time unproductively. The company decentralized operations, bought mobile equipment to move men and materials and established new craft lines that combined specialists' duties. Result: Reduction of high-cost personnel from 926 to 620.

Further refinement of maintenance organization will result from greater reliance on a device generally considered the exclusive domain of production departments the time-motion study. That was the prediction of Stuart Whitehead, maintenance superintendent at American Cyanamid Co.'s Calco Chemical Division. Mr. Whitehead reported a recent study resulted in reduction of the ratio of helpers to mechanics from 1-to-2 to 1-to-10.

Second the Motion—W. C. Cooling, methods standards manager, International Resistance Co., concurs, asserting that as the machine replaces manual effort so improved maintenance becomes the function that must keep production at a high level.

By E. C. KREUTZBERG *Washington Editor*

U.S. Studies Plans for Industry Survival in Case of War Damage

THE SENSE of urgency which has stepped up weapons development and military planning now is reflected in the government's "continuity-of-production" program, formerly titled "fast-attack" program.

This program calls for advance preparations to prevent prolonged breakdowns in essential production in the event of sudden enemy attack.

The President and his staff and all wartime government agencies would be switched to safe locations if Washington became a bomb target. Hospitals and schools, transportation and communications services and the vital manufacturing industries all would have plans for quick resumption of operations after damage by bombs.

This over-all program has existed on paper for several years as a chore to be accomplished at some time in the future. Now Dec. 31, 1954, has been set as the date for blocking out the master plan. By that time the managers of all essential activities and production plants are expected to know what they would do to get back into gear following a devastating bomb attack.

What they would be prepared to do varies for different activities and different industries. In a general way, trained personnel, inventories of spare and replacement parts and long-lead-time tools, reserve supplies of materials, and, when feasible, alternate facilities to move to from a damaged plant are among principal factors to be taken into account.

Already Started . . .

The continuity-of-production planning job is being done in the executive office of the President under direction of Lieut. Gen. Willard S. Paul, assistant director, Office of Defense Mobilization. His aide for applying the program in industry is Col. Ted E. Enter, director, Continuity of Industry Division, Nonmilitary Defense Area, ODM. The usual approach in getting co-operation from the vital defense industries is through the Commerce Department's industry advisory committees.

So far preattack and post-attack planning task groups have been set up in the machine tool, chemical, rubber, electrical machinery, precision jeweled watch movement, photo film, steel and transportation industries.

The steel industry task group is to report shortly on plans already made by individual producers and on a blueprint for inventories of refractories, rolling mill parts, gages and control instruments and the like that would have to be built up in advance. Already certain companies have built up some inventories, such as stand-by trackage for repairing interplant and intraplant railroad lines. One company has designated alternate locations for headquarters offices and communications systems in its various plants. The machine tool industry task group will undertake a survey to determine what has to be done to permit a switch in production of critical tools from damaged to undamaged plants.

Concentrated Facilities . . .

Because 81 per cent of our steel capacity is located in potential bomb target areas—such as Cleveland, Pittsburgh, Youngstown, Buffalo, Chicago—individual steel plants undoubtedly would sustain damage in event of bomb attacks.

Reporting from his experience in the Air Force in World War II and his subsequent investigations of loss of production in German steel plants due to bombing, Col. Enter said the loss was small. That's because the Germans started their post-attack planning as early as 1936. So when the bombs came, the German steel masters were ready to replace rails in bombed tracks, to turn to alternate sources of power, to get overhead cranes back into commission. Rolling mills were found to have been the most vulnerable steel plant departments. Bomb damage to blast furnaces and open-hearth furnaces was relatively slight and quickly repaired. Greatest loss of production occurred when rail lines were cut.

In general, the vital industries would develop an over-all industry plan, with individual plants shaping their own plans under the industry plan. However, it is realized that government participation would be required. For example, ODM is preparing a plan for a nation-wide damage-reporting system for quick determination of the scope and nature of bomb damage and the remedial measures.

Where the costs of preparation exceeded the economic capability of the companies involved the government might have to furnish financial assistance. Again, the government might have to arrange for alternate sources of power, for diversion of manpower, for priorities on materials, components, and so on.

Possible new legislation from Congress may be necessary.

what's new

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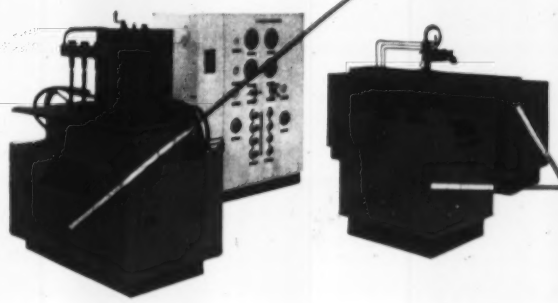

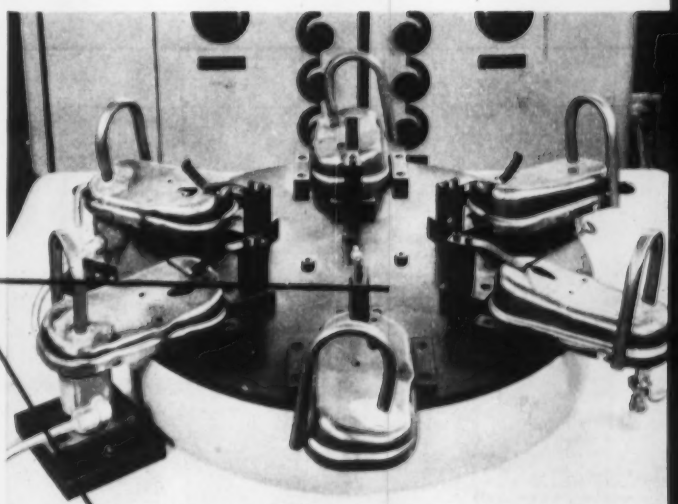

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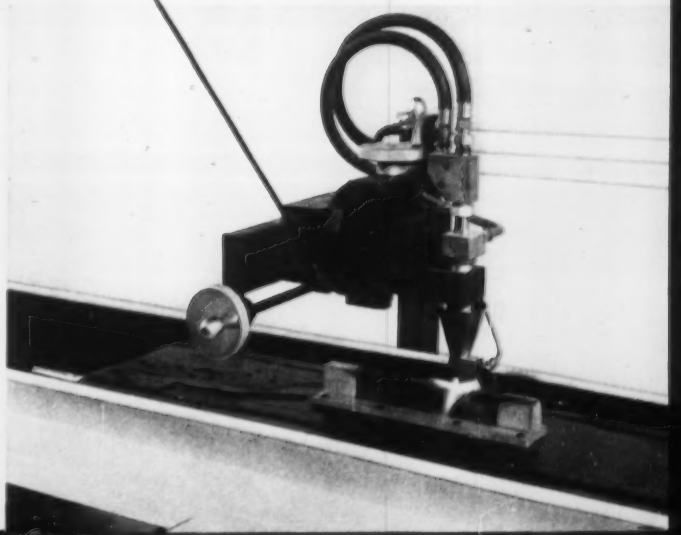

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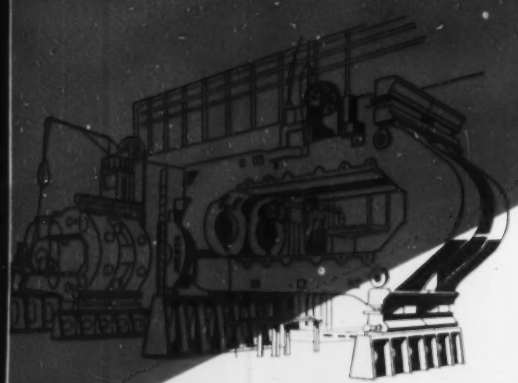

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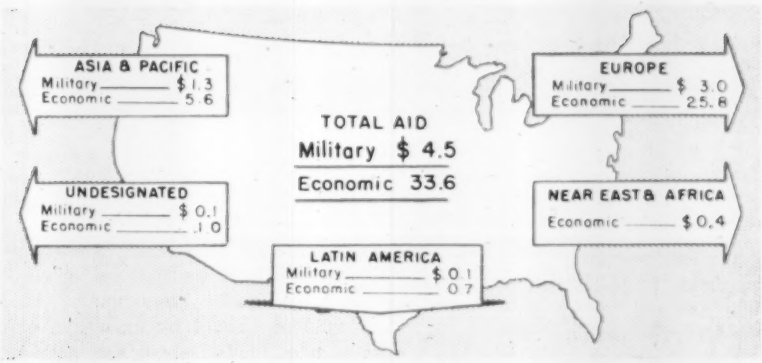


Toward a Freer Trade Policy

That's the gist of the report by the Randall Commission on foreign economic policy. It calls for lower tariffs, foreign investment incentives and currency convertibility

THE REPUBLICAN ADMINISTRATION has put its O.K. on a freer trade policy, carrying on a trend begun some 20 years ago under the New Deal. Some Republicans in Congress will balk at many recommendations, but their opposition will be to the degree of freer trade, not to general policy.

Author of the trade recommendations is the President's Commission on Foreign Economic Policy, chairmanned by Clarence B. Randall, chairman of Inland Steel Co., and composed of three other businessmen, two economists, one labor leader, six Republican congressmen and four Democratic congressmen.

Coloring—The commission's report is controversial only because it deals with a controversial subject. Actually, it is moderate in tone, even faint in spots where particularly extensive compromise was necessary to reconcile the divergent views of the 17 members. Despite the occasional weaknesses, the report holds tremendous significance to industry.

That's because the report, with the inevitable modifications, promises to be the platform on which our foreign economic policy will stand for the next decade or two, regardless of who's in power. Such has been the history of the trade policy fashioned in the early 1930s. And in the area of foreign trade, the government's position on tariffs, taxation of foreign income and the myriad of related matters is all-important to the profit on and volume of foreign trade. At least 10 per cent of the production of such metalworking items as machine tools, textile, machinery, agricultural machinery, oil field equipment, diesel engines and motor trucks is annually sold to export markets.

Overemphasis? — In the nine days since the commission submitted its report to the President and Congress, much has been made of the dissents that pepper the document. The major dissenters are Daniel A. Reed (Rep., N. Y.) and Richard M. Simpson (Rep., Pa.), chairman and member, respectively, of the House Ways & Means Committee which gets first crack at tariff and tax measures. Not so strongly opposed to the report but still dissatisfied is Sen. Eugene D. Millikin (Rep., Colo.), chairman of the Senate Finance Committee which corresponds to the house Ways & Means group.

While those men are influential, two polls indicate that the majority of their countrymen disagree with them and favor lower tariffs and a more liberal foreign economic policy, as outlined by the majority on the Randall Commission. Press Opinion Reports, a Washington research organization which continuously studies the editorial positions of newspapers across the country, reports that four out of every five papers — most of them Republican in outlook — are today urging more liberal trade policies despite the Republican party's high-tariff reputation. Similarly, Research Institute of America polled 500 business and labor leaders and found that 92.5 per cent believe that the U.S. should actively work for free

Clarence B. Randall combines duties as chief executive of Inland Steel Co. with government service, public speaking and authorship. He leaped into public prominence with his rebuttal to Harry Truman during the 1952 steel strike. His national stature also rests on his books, *Creed for Free Enterprise* and *Freedom's Faith*, which set forth his ideas on business morality, and on his contributions to foreign economic policy, summarized here.

trade, that 60.4 per cent favor lower U.S. tariffs and that 83.3 per cent feel that freer world trade would benefit our economy as a whole.

Perspective — Several different approaches to our foreign economic policy would probably end us up in about the same position. The commission is more interested in action "because of the obvious urgency of the matters involved. . . There still exists a serious distortion in our economic relationships with the rest of the world."

As Mr. Randall has written on another occasion: "In most situations there are half a dozen possible plans proposed, any one of which would work reasonably well, and it is far more important to select one and get on with the job than it is to prolong the debate until the last shred of doubt as to which is the perfect can best be removed."

Crux of the Matter—The central problem in foreign trade today, according to the commission, is the concealed dollar gap. Marshall Plan aid and other U.S. economic assistance (see the accompanying chart) has helped tremendously to bring about an apparent dollar balance in world trade. But actually, there's still a hidden gap of some $2 billion to $3 billion annually because of "extraordinary" dollar expenditures in disbursements by our military and civilian establishments abroad, offshore procurement and stockpiling.

The entire report is primarily concerned with the steps that the U.S. can take toward solving the world's dollar problem.

Tariffs—Paradoxically, the commission's recommendations on tariffs are causing the most debate, but the report itself states that reduced trade barriers will probably not solve world problems. But it recommends freer trade—not free trade—for consistency's sake and as an example to other countries. It points out that our tariffs have already been cut so that they are now among the lowest in the world (see accompanying chart).

The nine tariff-affecting proposals are these:

1. The present reciprocal trade program, under which the President can cut tariffs in return for similar concessions by foreign countries, should be extended for three years beyond the expiration date of June 12. In addition to the existing power to reduce levies under this law 50 per cent under the levels of 1945, the President should have additional authority to cut any rate a further 5 per cent in each of the three years. That latter provision applies to items on which tariffs have already been cut the limit allowed by the present law.

2. The President should be allowed to cut by as much as 50 per cent of 1945 rates the tariff on items "which are not being imported or which are being imported in negligible volume" without receiving any reciprocal concessions in return.

3. He should also be allowed to reduce to 50 per cent any rate which is higher than that. That would be a boon to foreign manufacturers of toys, scientific instruments and a few other products.

4. The language in the present "peril point" and "escape clause" provision in the trade law should be modified to make clear that the President can cut a tariff or retain a previous reduction despite those provisions "wherever he finds the national interest requires it." The peril point provision is intended to prevent the President from reducing tariffs through the reciprocal trade program below the danger level. The escape clause is intended to allow raising of a tariff previously reduced if injury threatens a domestic industry.

5. The "Buy American" act should be amended to make it not applicable to countries whose governments will treat American goods the same as their own goods. Pending such amendment, the President should by executive order practically repeal the act by directing procurement agencies to consider foreign bids "on substantially the same price basis as domestic bids."

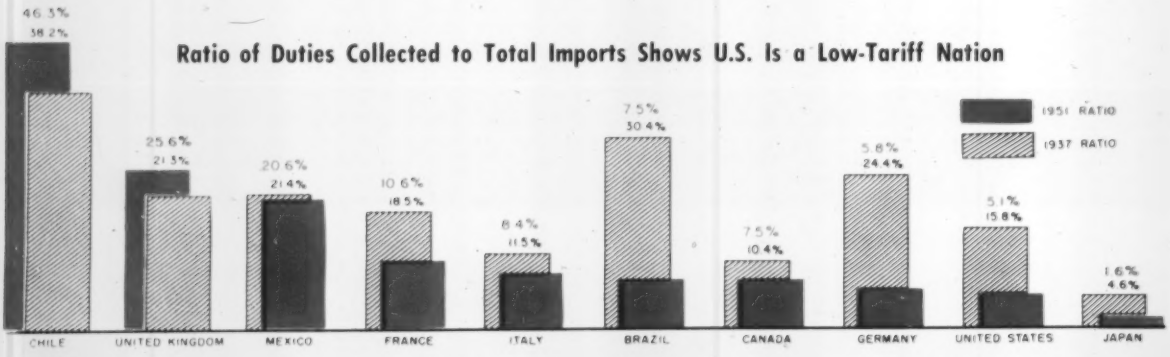
6. The present complex system of tariff classification should be revised by way of a study by the Tariff Commission. By that means a lot of tariffs could be reduced.

7. The "second customs simplification bill" should be passed. That has passed the House and is before the Senate. It would change the valuation provisions of the law—not tariff classification—by setting up only one standard of value to be used.

8. In the antidumping law, aimed at preventing artificially cheap sales of foreign goods, the Treasury should work out a change to make clear that imports can continue while an investigation is on.

9. The General Agreement on Tariffs and Trade, under which most American tariff-cutting under the reciprocal trade law has been accomplished, should be renegotiated to restrict its functions to multilateral tariff negotiation. If that's accomplished, Congress should consider extending the act

Ratio of Duties Collected to Total Imports Shows U.S. Is a Low-Tariff Nation



for a longer period than three years, once the proposed three-year extension expires.

The Root of Trade—The commission believes that more help for trade stability and greater trade volume (see the chart) can come from increased foreign investment and currency convertibility than from tariff tinkering. Most of its recommendations for incentives to foreign investment have already been incorporated in Mr. Eisenhower's tax requests submitted Jan. 21.

Recommendations include the proposal that corporations with foreign investments be taxed at least 14 percentage points less than the domestic levy. The Randall Commission also urges extension of the present program of government guaranties on convertibility of currency and expropriation to cover war and revolution.

Flow of Money—On convertibility, the commission says that the present gold-dollar reserves of the key foreign countries are not now adequate for them to free their currencies without help. So, it advocates use of the $3.3 billion in the International Monetary Fund as backing for convertibility and also direct U. S. help in the form of a stand-by credit extended by the Federal Reserve System.

Other recommendations:

1. Repeal the law that provides that American ships must carry 50 per cent or more of foreign aid cargoes and keep our merchant marine in business by other means.

2. Handle our stockpiling carefully so it doesn't lead to world price instability and let world prices find their natural levels.

3. Do not use tariffs to protect high-cost mining here when foreign importing is cheaper. Subsidize those high-cost facilities from the defense budget if they are needed for defense.

4. Let the economy by natural means, not the government by artificial methods, assist workers displaced by imports resulting from lower tariffs.

5. Permit more East-West trade in nonstrategic goods.

6. Discontinue economic aid grants. Step up technical assistance. Use military aid cautiously.

In the Wind—The Randall report clearly shows the handwriting on the wall; we're headed for progressively freer trade. Even in the domestic watch industry which is particularly hard hit by imports, J. G. Shennan, president of Elgin National Watch Co., says: "Considered in terms of how an imperiled industry can protect itself, this means a firm rejection of the classic idea that cheap foreign competition inevitably destroys a domestic industry. . . We are hedging against foreign competition by diversifying. . ."

He urges continued protection of the precision instrument industry only on the grounds that it's an essential to defense. Other industrialists have gone still farther in outright advocacy of free trade—notably Henry Ford II and John S. Coleman, president of Burroughs Corp. Their ranks are still small, although the significant thing now is that there are executives in that camp. Nor are the advocates for high tariffs as numerous as they once were.

Possible Tragedy—The vast majority of businessmen are like Marilyn Monroe, who is supposed to have said, "I believe in everything—a little." Most executives believe in a liberalized trade policy—a little. As Mr. Randall wrote in another connection: "On international trade, we are . . . alarmingly uncertain and divided. No one should blame the government for pursuing . . . policies that are neither clear nor consistent, for the confusion to be found in our official action reflects accurately the state of mind of our people."

One step in getting a clearer idea of the problems involved in world trade is to read the Randall Commission report. Copies are available at the nearest local office of the Commerce department.

U.S. Imports, Exports of Merchandise Since 1945

(millions of dollars)

	General Imports	Total Exports	Mutual Security Exports
1946	$4,942	$ 9,738	$
1947	5,756	15,340	
1948	7,124	12,653	
1949	6,622	12,051	
1950	8,852	10,275	282
1951	10,967	15,032	1,065
1952	10,717	15,176	1,988
1953*	10,812	15,608	3,506
Total	$65,792	$105,873	$6,841

* Estimated by STEEL.
Source: Commerce department, Bureau of Census

Investments Abroad Grow

Book value of foreign branches and subsidiaries of American companies exceeded $16 billion at the end of 1953, according to the Office of Business Economics. The 1953 value of these direct investments reflects added investments of over $4 billion since 1950.

Much of the recent increase in direct investments abroad is in enlargement of manufacturing plants, the value of which rose from $3.8 billion at the end of 1950 to $4.9 billion at the end of 1952. Direct investments in the Western Hemisphere accounted for about 70 per cent of the total value at the end of 1952. Leading countries for investment then were: Canada ($4.6 billion), Venezuela ($1.2 billion) and Brazil ($1 billion).

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- It is 50% stronger than mild steel.
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- It is readily and easily welded by any process.
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And with all these physical advantages over mild carbon steel—it can be cold formed as readily into the most difficult shaped stamping.

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GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division • Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

GAS TURBINE PROS AND CONS

FOR

Turbine produces maximum torque at standstill with uniform variations to maximum speed.
Transmission with only one ratio change would be required.
Clutch mechanism probably would not be required.
Operation with a wide range of fuels would be possible.
Absence of power impulses would probably reduce the vibration problem.
Lubrication problem might be simplified.
Electric ignition is required only for starting.

AGAINST

Fuel consumption is high, especially at part throttle.
Control and limiting devices must be developed to insure safe operation.
Space requirements appear large.
Lower first cost is questionable.
Lower maintenance cost is doubtful.
Separate device to produce braking torque might be required.
Silencing might present a difficult problem.
Large reduction gear ratio would be required.
Automotive power requirements are too low to show the turbines to their best advantage.

The Gas Turbine: Good Bet for Trucks, Busses, but not Autos

DETROIT

THERE WAS MORE turbine talk at the GM Motorama than at a sultan's hat show.

And the main reason visitors were so wrapped up in turbines lies in the belief that somehow Harry Horsepower's car of 195x will have a whirlfire twister attached to the end of the throttle.

Difficulties—Despite the success of turbines in aircraft, the obstacles stand mighty high against their use in passenger cars. Aircraft operate largely at a high per cent of throttle where the efficiency of turbines is good. Exhaust silencing in aircraft is a negligible problem compared with passenger cars. Aircraft turbines are large, reducing efficiency losses accordingly. In short, the nature of aircraft permitted the gas turbine to be developed to meet the power demands of aircraft beyond the capacity of reciprocating engines. With automobiles the situation is considerably different.

In a paper presented to the Society of Automotive Engineers, W. A. Turunen of GM's Research Laboratories Division made a few calculations on a 125-hp turbine theoretically installed in a 4000-pound passenger car. Compared with a conventional engine of 7 to 1 compression ratio at 100 mph the figures didn't look too bad—five miles per gallon on the turbine and about 7.5 miles per gallon for the reciprocating job. But at 25 miles an hour the conventional engine delivered almost 20 miles per gallon while the turbine was still hovering at only five.

Road Blocks—That might not be too critical since the turbine will run on anything from kerosene almost down to fumes from a drunk, which might lower fuel costs proportionally. But there are a number of other problems connected with passenger car turbines which presently offer posers.

Efficiency of the turbine, for example, can be increased through higher operating temperatures. The thermal efficiency of the unit increases from 13 per cent to almost 25 per cent with a temperature jump from 1350 to 2200 degrees F. On the other hand that means alloys, suitable ceramic materials and the development of a practical cooling system, all at a cost competitive with current production engines.

Engineering Needed—The gas turbine also presents a free-wheeling characteristic when power is cut off, contrary to the braking effect of conventional engine. Further, the transmission of power from a turbine shaft running at speeds approaching 40,000 rpm involves the use of extremely high reduction ratios. That could pose a difficult problem in lowering gear noise to an acceptable minimum.

Another aspect of noise less easily coped with results because the volume of gases handled by a turbine is about 11 times that of present engines. Though dust removal would be less important, the intake silencer would require a volume at least three times that of current units. And since exhaust back pressures pose a serious power loss to a turbine, ducts would have to be about ten times the cross sectional area required for a reciprocating job.

Fire Hazard — The muffler would have to be increased proportionally as well. That means if your present muffler is about the five-gallon size, your turbine job would tote something approaching a 55-gallon drum around. And although the exhaust gases with heavy loads at low speeds would be hot enough

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Auto, Truck Output

U. S. and Canada

	1953	1952
January	612,815	424,559
February	623,793	464,577
March	752,474	525,024
April	782,453	570,464
May	685,390	542,559
June	713,206	542,479
July	757,595	226,134
August	641,152	322,755
September	605,228	595,715
October	651,153	656,767
November	457,852	548,782
December	528,750	569,715
Total	7,829,461	5,989,509

Week Ended	1954	1953
Jan. 2	93,293	106,102
Jan. 9	152,418	139,620
Jan. 16	149,841	148,049
Jan. 23	151,567	149,550
Jan. 30	145,000*	150,289

Source: Ward's Automotive Reports
*Estimated by STEEL

to burn the nylons off a secretary in a cross walk at 20 paces, they could be directed upwards to merely burn the roof off your garage instead. And, incidentally, starting the turbine engine presently constitutes a dangerous fire hazard.

In application, the starting procedure is relatively simple. The ignition spark is energized, the gas generator rotor is brought up to speed and the fuel is applied. Should the engine not start immediately and an excess of fuel accumulate, burning fuel is blown out the exhaust.

Plus Side—There are some factors on the side of the turbine, however. It produces maximum torque at standstill with uniform variation to maximum speed, requires a transmission with only one ratio change and should eliminate the clutch. These features, of course, are also achieved through a conventional engine with an automatic transmission. But in addition, the turbine offers operation with a wide range of fuels, an absence of cylinder power impulses, a probable simplification of lubrication and elimination of ignition except for starting.

At present the turbine does appear to have a future in the auto industry. It will probably be felt first in trucks and buses where, as in aircraft, a greater percentage of near full-power operation may permit the turbine to compete with reciprocating engines. Although fuel would be comparable to diesel in cost, the torque characteristics of the turbine installation may show up favorably for truck application. Installation space economy also may not prove as acute as with passenger cars.

Research on Cars—As to the gas turbine in passenger cars, future developments will tell the tale. Chrysler is researching the field and Ford reportedly has a turbine car of its own in the latter stages. GM not only has the Firebird, but is experimenting with a turbine-powered bus, says Charles A. Chayne, engineering vice president. So the research that could put a turbine in your car of the future is under way.

Reciprocating engines with automatic transmissions offer a good torque package which meets highway conditions and is continually being improved. The turbine will have to go some to catch up.

Kaiser, Willys for 1954

A really outstanding styling job and factory-installed McCulloch supercharger on the Manhattan model highlight the Kaiser line for 1954. Billed accurately as "power on demand," the supercharger output is governed through manifold pressure and vacuum to give a top boost to 140 hp. Contrasted with the unblown Kaiser Special at 118 hp, the kick of the supercharger can be more readily appreciated. A reduction of 30 to 40 per cent in 0-60 mph acceleration time over last year's models can be expected, though tooling for a Kaiser V-8 is reportedly being ordered.

Increased glass area and redesigned interiors, positive valve rotators for exhaust valves, silicon-chromium intake valves and a chromed top piston ring are other Kaiser changes in the new models.

The Henry J is not mentioned in the new model announcement.

Hydra-Matic transmission, power steering and reportedly the "highest horsepower per pound" keynote the Willys offerings. With a new double-barreled carburetor the Willys Super-Hurricane 6-cylinder engine hits 115 hp, giving a 27 per cent horsepower increase over the 1953 Eagles and Aces, while the Lark now utilizes the 90 hp version.

Trim changes give new model identification, while an interesting new feature is the windshield wiper action. Moving in unison, the blades create a pattern in which each overlaps the other at the center of the windshield clearing an uninterrupted area.

1954 WILLYS EAGLE DELUXE HARDTOP

1954 KAISER MANHATTAN

. . . accent on safety: Willys' new windshield wiper, Kaiser's greater window area

DIE CAST OF ZINC

for AMERICAN KITCHENS

Here's Why ....

Appearance, the prime requisite in metal trim for home appliances, is one of the chief virtues of ZINC Die Castings. The two parts above—the principal components of the handle assembly for the American Kitchens dishwasher—are cast with a hardware finish* and are handsomely chromium plated, easily and economically. When a plated die casting is called for, ZINC gets the call.

But other important economies are realized by designing these parts specifically for die casting of ZINC. All of the openings and recesses required for assembly are cored in the die casting operation. The only secondary operations performed on the pictured castings were simple trimming, drilling and tapping. The close cast tolerances insure trouble-free assembly and the inherent strength of ZINC Die Castings easily resists the rough usage to which the handle will be subjected in service.

Home appliances are just one of many fields in which ZINC Die Castings are finding ever-increasing use. For a more complete picture of the scope of application send for our new booklet "The End Uses of Zinc Die Castings."

* An especially smooth as-cast surface; one so smooth that no grinding and little or no buffing are required to prepare the surface for plating.

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HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC

CLARK CONTROL at KAISER-FONTANA

Typical of the accuracy and dependability required of electrical controls in industrial automation are the Freyn Design, Clark-built blast furnace charging control systems installed for the 3 huge blast furnaces at the Fontana, California plant of Kaiser Steel Corporation.

Shut-downs at blast furnaces are costly. Proper sequence charging and distribution of coke, ore and limestone are vital to their continuous operation. Koppers-Freyn Engineers, leading designers of blast furnace charging controls, specified Clark-apparatus to keep these furnaces going 24 hours per day.

Clark engineered controls are the "mechanical brains" for countless automatic machines and processing lines in all types of industry. Clark engineers will gladly show you how best to solve your control problems.

Clark Control Panel for Freyn Design blast furnace charging control at the Kaiser-Fontana plant.

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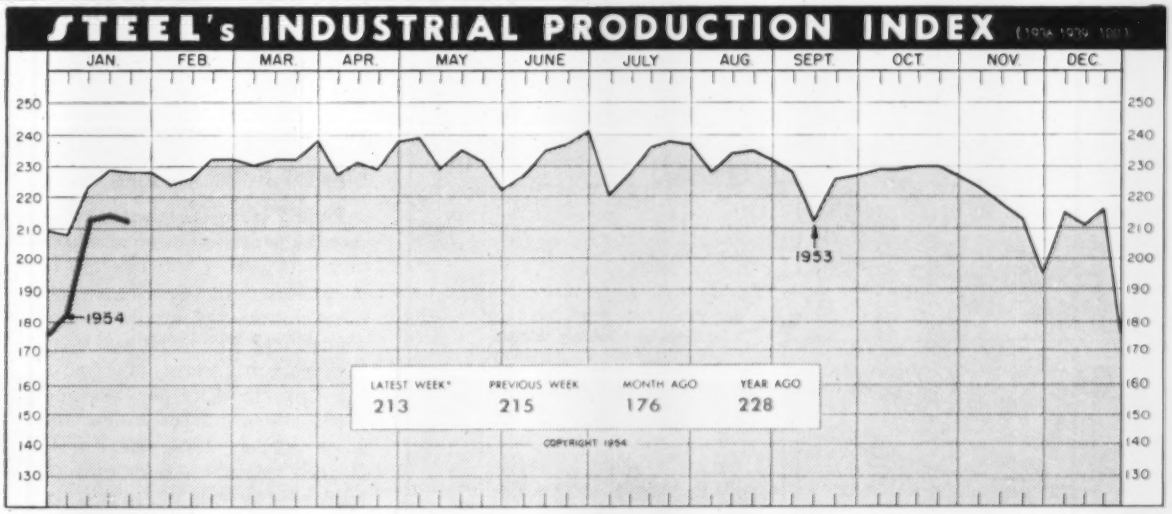


*Week ended Jan. 23

Based upon and weighted as follows: Steelworks Operations 35%, Electric Power Output 23%, Freight Car Loadings 22%, and Automobile Assemblies (Ward's Reports) 20%

Record Building Foreseen Even with Rising Costs

"MOST CONTROVERSIAL!" That is the general feeling about the dim picture of the present business decline drawn by Colin Clark, Oxford University dean and economist.

Speaking before a National Industrial Conference Board panel, England's Mr. Clark said that circumstances for business are not favorable. He explained that in relation to the labor force that has to be employed and the wages that have to be paid, money is scarcer now than it has been for many years. On the other hand, both inventories and fixed capital equipment, in relation to sales, are high. Housing and industrial and commercial building are not abundant, he declared. Choking off demand is high construction cost.

Costs Continue Climbing . . .

In fact, construction costs for industrial buildings were still rising in the fourth quarter. American Appraisal Co.'s construction cost index rose 2 percentage points during these months to 585 per cent of the 1913 average. Total climb last year of 3.2 per cent compares with a gain of 5.2 per cent in 1952. Wages and materials prices continue to push costs up.

However, Charles E. Slusser, commissioner, Public Housing Authority, looks for a decline in construction costs this year, though perhaps not on the scale believed necessary by Mr. Clark. In Mr. Slusser's opinion "while there might be a little less spent for homes and buildings and highways in 1954 than in 1953, there should be just as many or more homes, buildings and highways built. It is just that we will take the water out of 1953's figures and put it to work."

After General Motors . . .

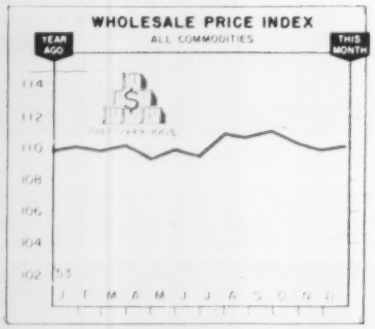
But that was spoken before General Motors announced its expansion program. Now Mr. Slusser predicts spending for all kinds of new construction will top the 1953 record of $34.7 billion. Earlier this year the Department of Commerce had estimated construction outlays at $34 billion.

December Construction . . .

Preceding GM's action and pointing to a healthy level of construction this year was December's construction volume, which, measured by most indicators, was down less than seasonally. Housing starts were estimated at 68,000 by the Bureau of Labor Statistics. Also, December marked the fifteenth consecutive month in which building permit values exceeded the year-ago level, says Dun & Bradstreet Inc. Total from 215 cities for the month was $372,858,042. Values were 0.7 per cent less than in November but 13 per cent above those of December, 1952. But, according to Dodge Reports, which are on an award basis, construction contracts in the 37 states east of the Rockies during the month were 7 per cent below November and 11 per cent behind December, 1952.

More Money Available . . .

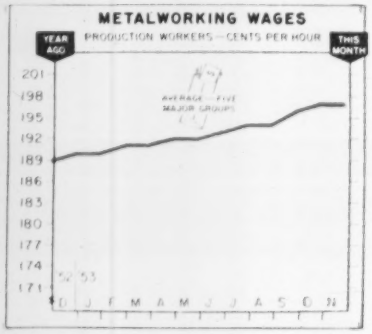
Mr. Clark also believes that a greatly increased supply of money and credit would mitigate but not check the fairly serious decline that in his words has begun and will continue. Of course, the British economist means more than is now available, and he assumes use of the additional money and credit almost immediately. In December, supply of commercial paper out-



Wholesale Price Index
(1947-1949 = 100)

	1953	1952	1951
Jan.	109.9	113.0	115.0
Feb.	109.6	112.6	116.5
Mar.	110.0	112.3	116.5
Apr.	109.4	111.8	116.3
May	109.8	111.6	115.9
June	109.5	111.3	115.1
July	110.9	111.8	114.2
Aug.	110.6	112.2	113.7
Sept.	111.0	111.7	113.4
Oct.	110.2	111.1	113.7
Nov.	109.8	110.7	113.6
Dec.	110.1	109.6	113.5

U. S. Bureau of Labor Statistics

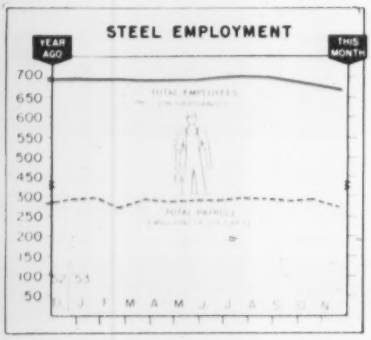


Metalworking Wages
(cents per hour)

Production Workers—Five Major Groups

	Prim. Mtls.	Fab. Prod.	Mach. inery	Elec. Mchy.	Trans. Equip.
1952					
Dec.	201	181	192	170	204
1953					
Jan.	203	181	193	172	203
Feb.	201	182	194	173	205
Mar.	201	183	195	173	205
Apr.	201	183	195	174	206
May	202	183	196	174	205
June	205	184	195	175	207
July	209	185	195	176	207
Aug.	208	185	196	177	206
Sept.	212	186	198	178	207
Oct.	208	187	199	177	209
Nov.	208	188	199	178	210
Dec.	208	188	199	178	212

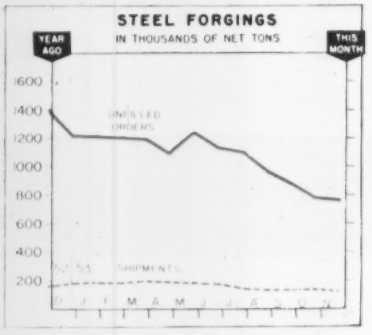
U. S. Bureau of Labor Statistics



Steel Employment, Payrolls

	in Thousands		in Millions	
	1953	1952	1953	1952
Jan.	684	672	$285.4	$252.2
Feb.	685	674	261.3	234.9
Mar.	683	672	281.0	242.7
Apr.	685	670	278.0	225.6
May	685	662	281.0	223.1
June	690	*	282.1	*
July	696	*	288.1	*
Aug.	696	660	287.3	250.4
Sept.	688	674	283.8	269.4
Oct.	678	677	290.6	282.9
Nov.	667	680	268.5	269.7
Dec.		684		280.0

*Not available because of steel strike
American Iron & Steel Institute



Steel Forgings*

Thousands of Net Tons

	Shipments		Unfilled Orders	
	1953	1952	1953	1952
Jan.	184	271	1,207	1,472
Feb.	184	277	1,199	1,464
Mar.	200	266	1,197	1,360
Apr.	196	277	1,082	1,349
May	191	263	1,239	1,319
June	185	224	1,135	1,248
July	155	132	1,081	1,290
Aug.	151	121	974	1,399
Sept.	153	140	882	1,392
Oct.	156	178	798	1,393
Nov.	145	156	742	1,399
Dec.		181		1,377

U. S. Bureau of the Census *Data based on reports from commercial and captive forge plants with monthly shipments of 50 tons or more

Charts Copyright 1954 STEEL

Issue Dates on other FACTS and FIGURES Published by STEEL

Construction	Dec. 28	Gray Iron Castings	Jan. 18	Ranges, Elec.	Nov. 2
Durable Goods	Dec. 14	Indus. Production	Nov. 23	Ranges, Gas	Jan. 11
Employ., Metalwk.	Jan. 25	Ironers	Nov. 23	Refrigerators	Nov. 2
Fab. Struc. Steel	Dec. 21	Machine Tools	Dec. 7	Steel Castings	Jan. 18
Foundry Equip.	Jan. 25	Malleable Castings	Jan. 18	Steel Shipments	Jan. 11
Freight Cars	Jan. 25	Prices, Consumer	Dec. 7	Vacuum Cleaners	Jan. 11
Furnaces, Indus.	Dec. 7	Pumps	Nov. 16	Washers	Dec. 21
Gears	Dec. 21	Radio, TV	Jan. 25	Water Heaters	Jan. 11

standing declined seasonally $30 million to a total of $552 million. Economic well-being of the borrowers and slower seasonal business activity, with a resultant reduced need for funds, increased the amount of this credit available and should continue to do so.

Interest Rates Slipping . . .

Easing of interest rates on commercial paper is due to similar factors. On Jan. 7 the interest rates on prime quality four-to-six month notes drawn by nationally known commercial, industrial and mercantile concerns were cut from 2.25 per cent to 2.12 per cent. This price represents the lowest return since October, 1951. More recently General Motors Acceptance Corp. reduced the rate it pays for the fifth time in four months. Just the other day a leading commercial paper dealer reduced its rate from 2.12 per cent to 2 per cent on highest grade loans of up to six months maturity.

Metalworking Tempo Up . . .

Rise in loans to manufacturers of metal and metal products in the week ended Jan. 13 was due to a step-up of business activity. Although total business loans continued to decline, loans to these concerns climbed $22 million above the preceding week. The gain followed four consecutive weekly decreases.

Faster business pace would be welcomed by many industries and, of course, steelmaking. Not only are the current operations of some producers below the national rate, but their output is close to the break-even point.

Electricity, the Leader . . .

Electric output of over 9 billion kilowatt-hours during the week ended Jan. 16 set an all-time record. The 9,013,905,000 kilowatt-hours of electricity distributed in the record week spotlight the tremendous monthly gains that have been made in installed capacity. Electric utility industry's capacity in November reached 89,813,041 kilowatts, 11 per cent higher than the same month in 1952, the Edison Electric Institute reports. To attain the November name plate

BAROMETERS OF BUSINESS

	LATEST PERIOD	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Output (per cent of capacity)[2]	74.0	74.5	99.5
Electric Power Distributed (million kwhr)	8,976	9,014	8,144
Bitum. Coal Output (daily av.—1000 tons)	1,363	1,357	1,593
Petroleum Production (daily av.—1000 bbls)	6,350[1]	6,333	6,524
Construction Volume (ENR—millions)	$173.5	$195.8	$548.8
Automobile, Truck Output (Ward's—units)	151,567	149,841	149,550
TRADE			
Freight Car Loadings (unit—1000 cars)	615[1]	620	698
Business Failures (Dun & Bradstreet, no.)	210[1]	200	173
Currency in Circulation (millions)[3]	$30,083	$30,284	$29,687
Dept. Store Sales (changes from year ago)[3]	−8%	+7%	+2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$19,215	$18,396	$18,505
Federal Gross Debt (billions)	$275.2	$274.9	$267.3
Bond Volume, NYSE (millions)	$22.7	$26.7	$19.9
Stocks Sales, NYSE (thousands of shares)	9,018	7,590	6,866
Loans and Investments (billions)[4]	$80.4	$80.8	$78.0
U. S. Gov't Obligations Held (billions)[4]	$32.9	$32.9	$32.3
PRICES			
STEEL's Finished Steel Price Index[5]	189.74	189.74	181.31
STEEL's Nonferrous Metal Price Index[6]	203.2	205.7	213.2
All Commodities[7]	110.9	110.9	109.9
Commodities Other Than Farm & Foods[7]	114.5	114.5	113.1

[1]Dates on request. [2]Preliminary. [3]Weekly capacities, net tons: 1954, 2,384,549; 1953, 2,254,459. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

rating, capacity rose by more than 1 million kilowatts during each of the two preceding months.

Industrial Output Slides . . .

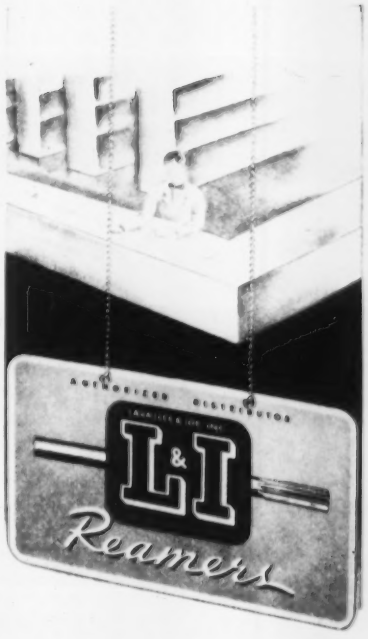
On the basis of preliminary figures, industrial outturn slipped during the week ended Jan. 23. Slight reduction in steel production and railroad freight car loadings caused STEEL's index of industrial production to register 213 per cent of the 1936-1939 average, 2 points below the previous week and 15 points under the comparable week last year.

Drastic Remedy? . . .

And what does Mr. Clark advocate to check any further business decline? He wants our legislators deliberately to organize a large deficit over the next 18 months. Payments to unemployed, farm payments and public works will cause a cash deficit; but in addition to these moves, Congress should make deliberate reductions of taxation. Of all such reductions, the most fruitful would be in excises and similar taxes. The whole amount of such reduction would create additional consumer spending power, without any diminution or delay, Mr. Clark thinks. The size of the cash deficit required: $2 billion during the worst months that lie ahead if tax rates remain unchanged and the recession is allowed to take its course.

Trends Fore and Aft . . .

Average hourly payroll cost of wage earners in the iron and steel industry in November was $2.323, the second highest ever paid, even though wage earners worked an average of only 38 hours a week during the month, the American Iron and Steel Institute reports . . . In line with expected trend, the consumer price index of the Bureau of Labor Statistics dipped to 114.9 per cent of the 1947-1949 average in December, 1 point below November . . . On Dec. 1, 1953, the total population of the U. S. was estimated at 160,957,000 by the Bureau of the Census . . . Joseph H. Detweiler, secretary-treasurer, Argus Cameras Inc., says that relief from the now expired excess profits tax should provide the company with an additional 60 per cent in net earnings in fiscal 1955 if gross profit is maintained at current levels . . . Number of grants for commercial TV outlets now totals 497, according to the Federal Communications Commission.



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EDWARD J. PRATT
. . . Amco Gage first v. p.

FRANK A. MESTA
. . . Mesta Machine exec. v. p.-treas.

LOREN J. WESTHAVER
. . . new position with Columbia-Geneva

Edward J. Pratt was elected first vice president and **John S. Gorski** second vice president of **Amco Gage Co.**, Detroit. Mr. Pratt, who is general manager, joined the company as chief accountant in 1943, two years after it was founded.

Carl E. Overton was elected vice president in charge of sales, **Brad Foote Gear Works Inc.**, Cicero, Ill. He has been sales manager since 1950.

David E. Pierce was appointed to the newly created position of director of manufacturing control at **Diamond Alkali Co.**, Cleveland. For the past year he operated his own consulting engineering business in New York. Formerly he served as chief engineer, General Aniline & Film Corp.

G. W. Steinmetz was made sales manager, chuck division, **Supreme Products Inc.**, Chicago. He was formerly assistant sales manager, Standard Tool Co., Cleveland.

Robert Von Rotz was appointed chief engineer, **Tuthill Pump Co.**, Chicago. He has been chief engineer, Applied Research & Development Corp.

Harry T. Zimmer Jr. was appointed chief of production control and industrial engineering of **Oliver Iron & Steel Corp.**, Pittsburgh.

Frank A. Mesta was elected executive vice president and treasurer and **John D. Iversen** vice president in charge of operations at **Mesta Machine Co.**, Pittsburgh. Mr. Mesta succeeds his brother, the late **Lewis W. Mesta.**

H. A. Harrington assumes the newly created position of assistant general manager of H. K. Porter Co. Inc.'s **Leschen Wire Rope Division**, St. Louis. He was formerly special assistant to Porter's executive vice president.

Everett C. Gosnell joins **Ohio Machine & Boiler Co.**, Cleveland, as chemical engineer. He was formerly chemical engineer in research with Koppers Co.

John C. Ketterer was named assistant superintendent of operations at the Midland, Pa., plant of **Mackintosh-Hemphill Co.** He was formerly manager of production at Midland where he is succeeded by **Wilson J. Rhodes.**

Carl G. Nordmark is now advertising and sales promotion manager, **L. S. Starrett Co.**, Athol, Mass.

Richard H. Ewert was named general sales manager, **Illinois Gear & Machine Co.**, Chicago.

Consolidated Iron-Steel Mfg. Co., Cleveland, named **Robert S. Minning** director of purchases.

Loren J. Westhaver, vice president and manager of Utah operations for **Columbia-Geneva Steel Division,** U. S. Steel Corp., was moved to the division's San Francisco headquarters as general manager of operations, a new executive position in the operating department headed by **L. S. Dahl,** vice president.

Charles H. Carroll, formerly director of purchasing, **Ford Motor Co.,** Dearborn, Mich., was named director of the purchasing office, manufacturing staff. Until Mr. Carroll's appointment, all staff purchasing activities were directed by **Irving A. Duffy,** vice president-purchasing, who is now vice president and general manager, tractor and implement division.

Sharon Steel Corp., Sharon, Pa., promoted **J. J. Kraus** to vice president of sales for the corporation and **D. A. Nabb** to general manager of the Detroit Tube & Steel Division. Mr. Kraus succeeds **D. B. Carson,** who continues as a vice president. Mr. Nabb replaces Mr. Kraus in Detroit.

Merlyn G. Woodle was made superintendent of **Republic Steel Corp.'s** Minnesota ore mines to replace the late **J. H. Hocking.** He is located at Hibbing, Minn.

A. E. Milner was made arch and wall sales manager, **Laclede-Chris-**

HOWARD R. RICHARDS
. . . *Industrial Ovens president-gen. mgr.*

ROBERT McNEAL SMITH
. . . *Pittsburgh Screw & Bolt v. p.*

W. S. TRUESDELL
. . . *gen. mgr., Buffalo Steel Div.*

ty Co., St. Louis. He was manager of Granco Steel Products Co.'s Cofar Division.

Industrial Ovens Inc., Cleveland, following reorganization, made the following personnel changes: **Howard R. Richards** was elected president and general manager, **Sloane E. Allen** is vice president and treasurer, **Louis A. Litzler** is secretary, **E. W. Baumgardner** sales manager and **A. V. Alexeff** chief engineer.

Maynard A. Laswell, vice president of C-O-Two Fire Equipment Co., was also made vice president in charge of sales of **Pyrene Mfg. Co.** The affiliated companies have general offices in Newark, N. J.

Michigan Steel Casting Co., Detroit, appointed **Jack Bean** president-general manager, **Harold Schroeder** vice president-operations, **Walter Hakin** vice president-sales, and **Elry Christensen** sales manager.

Garth S. Thompson was elected president and general manager, **Misco Fabricators Inc.**, Detroit.

Robert McNeal Smith was elected a vice president of **Pittsburgh Screw & Bolt Corp.**, Pittsburgh. Formerly assistant vice president-sales, eastern area, he has served the corporation in various sales capacities since 1941. Mr. Smith continues offices in New York. **W. A. Anderson** was appointed manager of operations, Pittsburgh and Graham plants, to succeed **Wallace W. Smith**, who remains in an advisory capacity.

Karl M. Midney, former president of Metal Industries Inc., Youngstown, recently dissolved, has joined **Reznor Mfg. Co.**, Mercer, Pa., as district sales manager for the Florida territory.

W. S. Truesdell was appointed general manager of H. K. Porter Co. Inc.'s **Buffalo Steel Division**, Tonawanda, N. Y. Mr. Truesdell, with Buffalo Steel for 23 years, succeeds **A. E. Klinger**, now vice president in charge of commercial development.

Harold D. Jolley, senior vice president, **Ceco Steel Products Corp.**, Chicago, was appointed to the newly created position of senior vice president and manager of sales. He is succeeded as vice president of the structural products division by **Elmer T. Gustafson**, vice president formerly in charge of the eastern seaboard operations. **C. Foster Brown Jr.**, former vice president, Sterling aluminum window division, becomes vice president and assistant to the president. **N. H. Bell**, aluminum window sales manager, was promoted to manager, aluminum window department. **George R. Wernisch**, manager of the steel joist and roof deck department, replaces Mr. Gustafson as eastern regional manager, effective in March, and is in turn succeeded by **Howard J. Richter**.

F. Gordon Borowsky was elected president of **George K. Garrett Co. Inc.**, Philadelphia. Former president **A. G. Borowsky** was elected chairman of the board.

Appointments in the southwest territory of **Sheffield Steel Corp.** include **Glenn F. Johnson**, transferred to San Antonio, Tex., as district manager. He is replaced as district manager, Little Rock, Ark., by **H. H. Gray**. Mr. Johnson replaces **George P. McCracken**, made district manager at Dallas to succeed **D. W. Roberts**, now manager of the Houston sales office.

A. R. Ficker was made director of advanced engineering for **Borg-Warner Corp.'s** Rockford Clutch Division, Rockford, Ill.

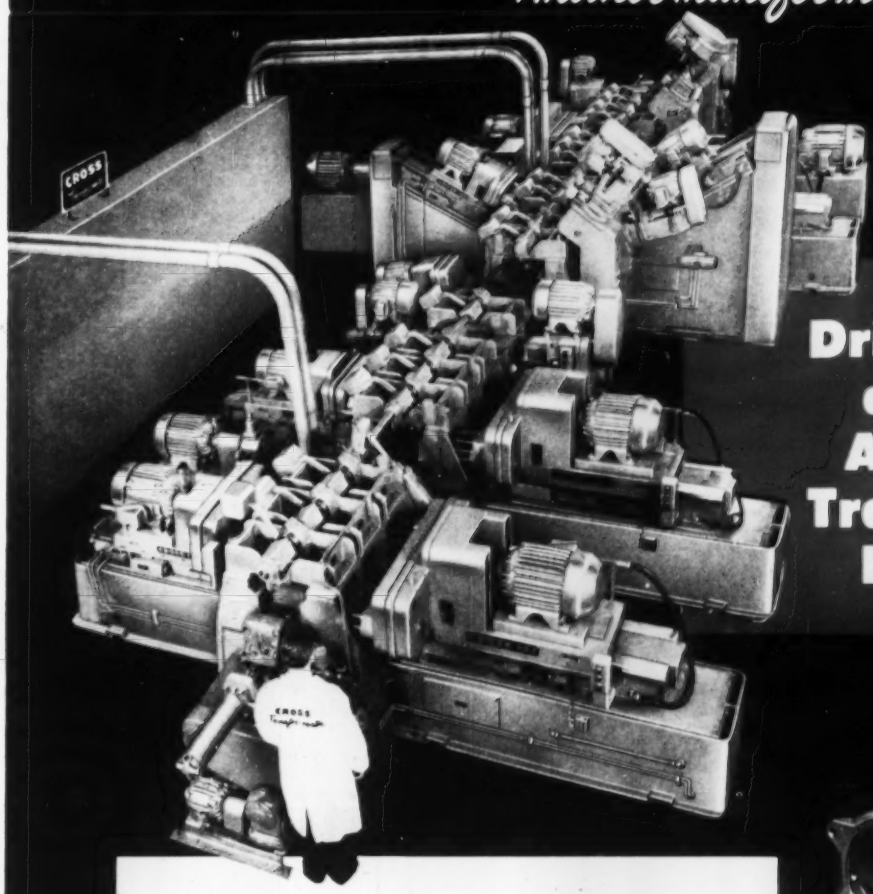
A. R. Edwards was elected president, **Armco International Corp.**, Middletown, O. He has been vice president-sales. **E. A. Emerson**, president since 1931, becomes chairman of the executive committee. **Charles R. Hook**, chairman of Armco Steel Corp., relinquishes the chairmanship of Armco International to **W. W. Sebald**, Armco Steel president.

W. J. Ulrich, senior sales representative in the Detroit area, was elected vice president of **Carborundum Co.** He continues sales activities in the Detroit area and will report to the vice president of sales in Niagara Falls, N. Y.

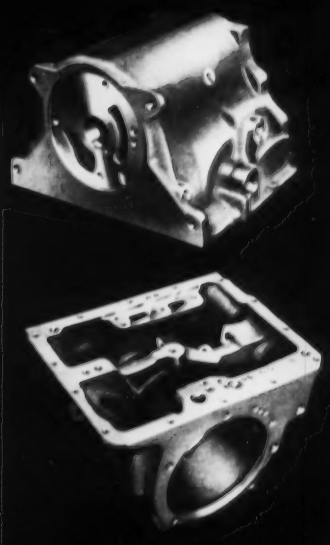
Frank J. Connolly was appointed eastern regional manager for **Pandjiris Weldment Co.** He has headquarters in Plainfield, N. J. For the last nine years he has

(Please Turn to Page 72)

Another Transfer-matic by Cross



Drills, Reams and Taps Automatic Transmission Housings



★ 29 stations.
★ 78 operations—30 drilling, 12 chamfering, 4 end milling, 3 counterboring, 14 reaming, 15 tapping.
★ 100 pieces per hour at 100% efficiency.
★ Automatic 90° indexing of part in station 14 for drilling sides and top in subsequent stations.
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★ Complete interchangeability of all standard and special parts for easy maintenance.
★ Other features: Automatic transfer from station to station; hydraulic feed and rapid traverse; individual lead screw feed for tapping; hardened and ground ways; gravity operated cam clamping; J.I.C. standard construction; built-in chip conveyor.

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The most significant opportunity ever offered machine tool users!

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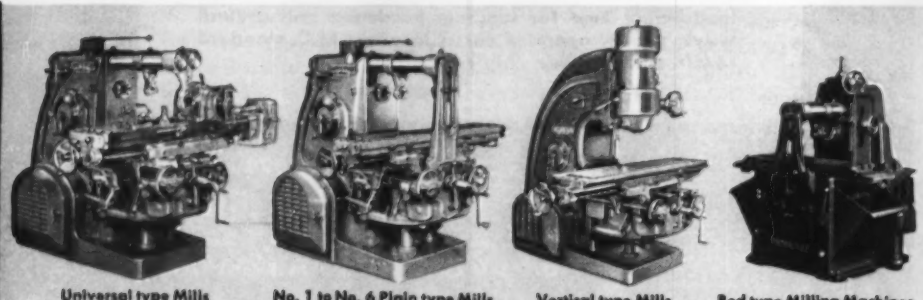

Universal type Mills | No. 1 to No. 6 Plain type Mills | Vertical type Mills | Bed type Milling Machines

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TOOL-LEASE ALLOWS YOU TO—

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- ✓remain debt free
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- ✓be unrestricted by creditor's limitations
- ✓keep future borrowing capacity unimpaired
- ✓simplify your financial structure
- ✓obtain optimum efficiency, flexibility and capacity to meet constantly changing production requirements.
- ✓try out, in effect, new machines... without having to buy them

TOOL-LEASE HELPS YOU GET THE EXACT TOOLS FOR THE JOB—

Under Kearney & Trecker's Tool-Lease Program, you may obtain any standard Kearney & Trecker machine tool. This includes: standard knee-type and bed-type milling machines and precision boring machines. Special lease agreements will be considered where either special machinery or applications of heavy-duty CSM bed-types are required.

TOOL-LEASE GIVES YOU 3 PLANS TO CHOOSE FROM—

The basic Tool-Lease Program gives you a choice of three plans with varying options to terminate the lease, continue the lease or purchase the equipment. Depending upon the plan selected, equipment may be leased for one, two or three or more years.

Your Kearney & Trecker representative will be pleased to give you specific Tool-Lease information and help you analyze your machine tool needs... suggest the equipment that will best help you solve your production problems. Write, wire or phone Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wisconsin.

TOOL LEASE
KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS
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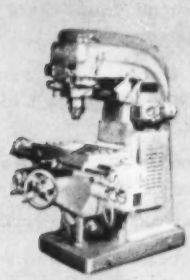
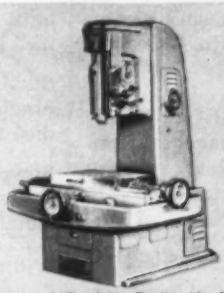
Fill out and attach coupon to your letterhead and mail for Tool-Lease Bulletin.



Rotary Head Milling Machines



Automatic Precision Boring Machines

Kearney & Trecker Corporation
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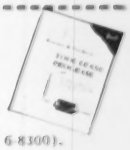

Please send me Bulletin TL-10A with details on the Tool-Lease Program.
☐ Check here if you would like to have a representative call on you as soon as possible (or call Milwaukee, GReenfield 6-8300).

Name .....

Title .....

Company .....

Address .....

City ..... Zone ..... State .....

EUGENE H. TEGTMEIER
. . . v. p.-sales at Tempel Mfg. Co.

ROBERT L. LARSON
. . . Ryerson's alloy steel div. mgr.

FRED F. ROEHLL
. . . Eutectic Welding Alloys sales v. p.

(Continued from Page 68)
been manager of Worthington Corp.'s positioning equipment division.

Eugene H. Tegtmeier, sales manager for **Tempel Mfg. Co.,** Chicago, was promoted to vice president in charge of sales and **Fred A. Slaughter,** assistant to the president, was made sales manager.

S. N. Bean was promoted to chief manufacturing engineer for **Lockheed Aircraft Corp.'s** Georgia division. He fills a vacancy at the Marietta, Ga., plant caused by advancement of **R. R. Kearton** to assistant manufacturing manager.

John S. Randall, former manager of the Toledo, O., Works of **A. O. Smith Corp.,** and since last September a member of the firm's automotive division staff in Milwaukee, was made division manager. He succeeds **C. E. Heitman,** promoted to assistant general manager.

Robert L. Larson was appointed manager, alloy steel division, **Joseph T. Ryerson & Son Inc.,** Chicago. He is succeeded as manager of alloy steel sales, Chicago plant, by **William P. Loehrer,** formerly a representative of the alloy and stainless steel department.

C. C. Tippit, general purchasing agent since 1950 for **Reliance Electric & Engineering Co.,** Cleveland, takes over administration of the company's purchasing systems and procedures following retirement of **Jesse C. Davis,** director of purchases.

Howard W. Hudson was appointed vice president of **Panalarm Products Inc.,** Chicago. He will be in charge of engineering and production activities.

Cleveland Hardware & Forging Co., Cleveland, promoted **Louis H. Lundstedt** to sales manager-catalog line.

Fred F. Roehll, national sales manager of **Eutectic Welding Alloys Corp.,** Flushing, N. Y., was named vice president in charge of sales.

Robert A. Lubker was appointed manager, metals research department, **Armour Research Foundation,** Illinois Institute of Technology, Chicago. He replaces **Dr. Max Hansen,** resigned.

Copperweld Steel Co., Glassport, Pa., promoted **Leslie C. Whitney** to manager of development engineering, wire and cable division. He has served Copperweld since 1930 as chief metallurgist and is succeeded by **Harry F. Zinsser.**

Charles P. Kelsey was made manager of exports sales at **Weatherhead Co.,** Cleveland. A former Weatherhead employee, he recently served as assistant to the president of Lee Wilson Engineering Co.

OBITUARIES...

D. Birney Stokes, who retired as vice president-sales, **United States Pipe & Foundry Co.,** Birmingham, in 1952, died Jan. 17. He joined the company in 1910 and was made sales vice president in 1926.

Robert S. Leather, founder and chairman of **Lea Mfg. Co.,** Waterbury, Conn., died Jan. 18.

Harry H. Clark, 53, Chicago sales engineer for the valve and meter division of **Rockwell Mfg. Co.,** died Jan. 17.

Paul V. Wheeler, for 40 years Cleveland district manager for **Link-Belt Co.,** died Jan. 20. He joined the company in 1906 at Pittsburgh and was transferred to Cleveland in 1913.

Richard H. Stevens, chief engineer at **Bethlehem Steel Corp.'s** Sparrows Pt., Md., plant for 20 years until retirement four years ago, died Dec. 31.

Stanley J. Banas, 51, owner of **Stanley Spring Mfg. Co.,** Chicago, died Jan. 19.

Steve Duberstein, 47, vice president and co-owner of **Duberstein Iron & Metal Co.,** Dayton, O., died Jan. 19.

William H. Weston, 76, who retired a year ago as president, **Flower City Boiler Co.,** Rochester, N. Y., died Jan. 19.

Every Foundryman

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40 years ago, A. W. Belden wrote a paper that has stood the test of time and continues to be an outstanding contribution to our knowledge of the composition of the gases and distribution of temperature in the melting zone of a cupola. This paper has assumed new importance in the light of more recent information on the behavior of foundry cupolas and is reviewed by H. W. Lownie, Jr., Battelle Memorial Institute. Containing graphic presentations and complete analyses, this report will help foundrymen understand many troubles encountered from "low beds" and "oxidized iron". *Write for this informative 6-page report today . . . ask for free bulletin FO-9.*

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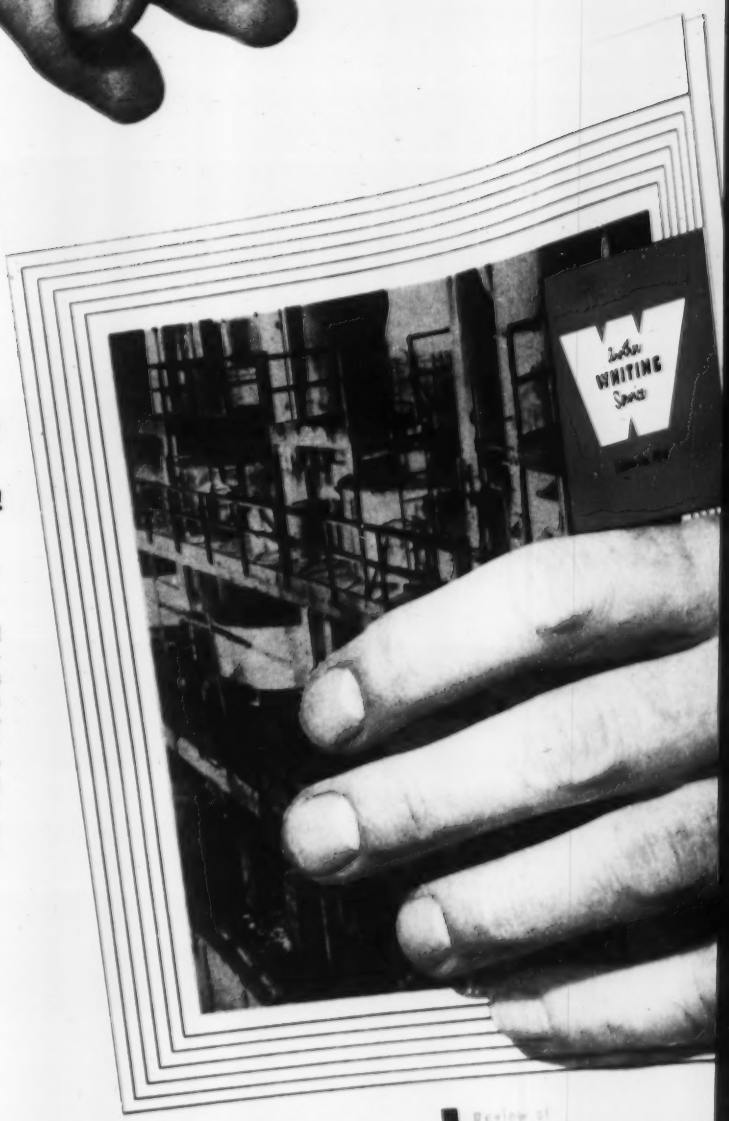

Write for these other Whiting Bulletins:

"How To Make Your Cupola Operation More Efficient"	FO-1
"Tips on Improving Cupola Charging"	FO-2
"Hot Blast"	FO-3
"Facts on Duplexing"	FO-4
"Here's How To Save Melting Fuel"	FO-5
"The Electric Furnace In the Iron Foundry"	FO-6
"Cupola Blast Control"	FO-7
"Suggestions for Solving Some Cupola Operation Problems"	FO-8

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Reynolds Wire Cloth is made to meet special-needs demands—all the way! From metal to mesh . . . from wire to weave . . . from ductility to durability. Its specifications are *your specifications*—its quality matches your products' quality. In any industrial application — automotive to agricultural.

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Trucks

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Divisions of National-Standard Co.

ATHENIA STEEL...*Clifton, N. J.*	Flat, High Carbon, Cold Rolled Spring Steel
NATIONAL-STANDARD...*Niles, Mich.*	Tire Wire, Fabricated Braids and Tape
WAGNER LITHO MACHINERY...*Jersey City, N. J.*	Metal Decorating Equipment
WORCESTER WIRE WORKS...*Worcester, Mass.*	Round and Shaped Steel Wire, Small Sizes

NS NATIONAL-STANDARD Company NILES, MICHIGAN

Titanium Casting Licensed

Howard Foundry Co.'s subsidiary will use NRC process to make titanium castings

FIRST nonexclusive license agreement covering National Research Corp.'s titanium shape casting process was granted to Titanium Casting Corp., a division of Howard Foundry Co., Chicago.

National Research Corp., Cambridge, Mass., over a period of several years has carried on research work directed toward the development of a process for production of cast shapes of titanium which involves special melting furnaces, casting procedures and mold materials capable of withstanding the attack of molten titanium. For almost a year, NRC has been experimentally producing small castings of titanium and titanium alloys with good chemical and physical properties. Its experience, know-how and patents are now available to industry through nonexclusive license agreements.

On Commercial Basis — By means of the agreement with Howard's subsidiary, titanium castings will be available commercially for use by American industry in applications where their high strength-to-weight ratio or extreme corrosion resistance will be of importance.

All functions and departments of NRC's Equipment Division are now located at the division's manufacturing plant at 160 Charlemont St., Newton Highlands, Mass. This division specializes in high vacuum equipment.

American Meter Co. To Build

American Meter Co., Philadelphia, will construct a $1-million plant at Fullerton, Calif., for manufacture of gas meters, gas regulators and instruments.

Hotpoint Enlarging Plant

Hotpoint Co., Chicago, is modernizing and enlarging its present factory. The program is designed to more than double the present plant's capacity for production of automatic clothes washers and dryers. Overhead conveyors and other materials handling equipment, successfully used in Hotpoint's refrigerator and range plants, will be adopted to home laundry appliance manufacturing.

Plant Opening Scheduled

International Powder Metallurgy Co., Ridgeway, Pa., will open its factory in Colorado Springs, Colo., by June 1. It will produce oilless bearings for autos, home appliances and aircraft.

Cory Names District Manager

Cory Corp., Chicago, manufacturer of appliances, housewares and advertising specialties, appointed Joe Todd to the position of Cory territory manager for the states of North and South Carolina. Mr. Todd's headquarters are in Charlotte, N. C.

Tool & Die Firm Builds Plant

Superior Tool & Die Corp., Los Angeles, completed a plant for production of television chassis and components at 1745 Flower St., Glendale, Calif.

Moves Closer to Steel Supply

United Boat Service Co., Kingman, Ariz., established a branch plant in Youngstown to be near its steel supplies. The firm produces metal packaging for shipping mortar shells under military contracts. R. L. Woods is general superintendent of the branch.

Filter Manufacturer Expands

Purolator Products Ltd. is expanding its facilities through erection of a factory addition in Toronto, Ont. When completed, the plant will be double the present size and floor area will total 80,000 sq ft. This is the third addition to the original building in four years. The company makes filters.

National Radiator Names Agent

Engineering Sales Co., Jackson, Miss., is now representing in that marketing area the heating products of National Radiator Co., Johnstown, Pa.

Plans $3-Million Pipe Plant

Canadian Western Pipe Mills Ltd., Vancouver, B. C., said it plans to build a $3-million steel pipe and tubing plant in suburban Richmond.

It has optioned a 60-acre site on the waterfront and will start construction early next year. Steel sheet will be imported at the start, but long-term plans call for an integrated steel industry based on British Columbia iron ore.

The plant will be the only one of its kind in western Canada. Steel pipe now is brought from eastern Canada or is imported.

Stamping Plant Is Opened

Federal Shortrun Stamping Inc., Rochester, N. Y., has begun operations at 961 Lyell Ave. It is a branch of Federal Tool & Mfg. Co., Minneapolis, and makes metal stampings for electrical, instrument and automotive equipment. Irving Cosner, superintendent, and Lincoln C. Hicks, sales manager, are directing operations.

Plans Tunnel Kiln Building

A building permit has been issued for erection of a $80,000 tunnel kiln building at National Grinding Wheel Co. Inc.'s plant in North Tonawanda, N. Y.

Donner-Hanna To Expand

Donner-Hanna Coke Corp., Buffalo, plans to enlarge and remodel boilers and saturators at its plant at a cost of $365,000. This is part of a general remodeling and expansion of the plant's coke facilities. Plans for the new phase of the program are still in the engineering stage, and no date has been set for start of the work.

Bell Aircraft Leases Plant

Bell Aircraft Corp., Buffalo, has taken a seven-year lease on the former Rice & Adams plant in Tonawanda, N. Y. Bell will use the plant in connection with its production of jet engine nacelles. Rice & Adams, a division of Pressed Steel Car Co., Pittsburgh, discontinued manufacturing operations in the plant last summer.

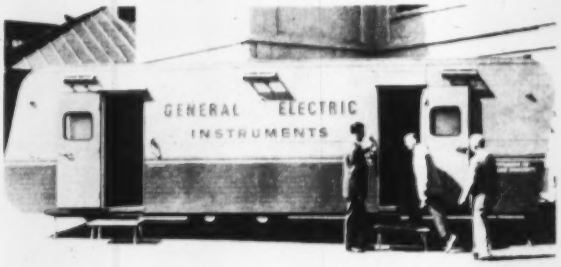
Mobile 3-D theater is contained in this demonstration coach specially built for Cincinnati Lathe & Tool Co. It tours manufacturing centers with an industrial film urging retooling

SALES SHOWS
HIT THE ROAD

A picture in a sales brochure may be worth a thousand words, but industry is discovering that the real McCoy talks even louder. In rapidly growing numbers, mobile sales rooms are rolling up to manufacturers' side doors with products ready to demonstrate and order books handy. Some of these units present movies or sales shows with a live cast. Others are equipped with machinery for brief production runs. All operate on the theory that the better mousetrap catches best when you bring it to the mouse.

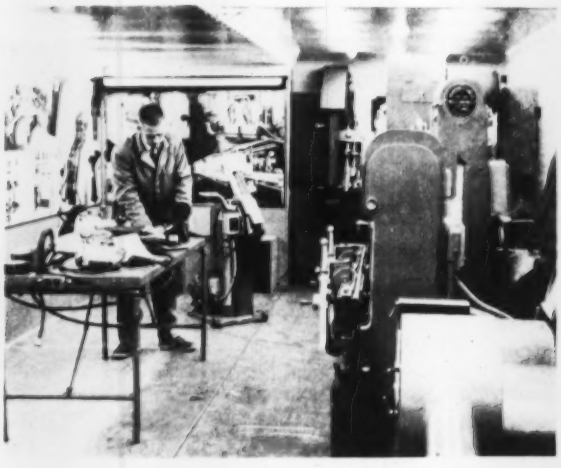
Simple exhibit designed to fit into station wagon does a good selling job for Reliance Electric & Engineering Co.

Typical touring exhibit is housed in trailer, has space for demonstrations, movies. This one shows GE products



House trailer serves as General Electric laboratory-on-wheels for demonstrations of latest specialty instruments

Traveling workshop has expanding wall which increases vehicle width to 15 feet. Inside, production grinding machines demonstrate use of Carborundum coated abrasive products



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And almost as fast as you get the answer, you can get the steel you need. For many of the REZISTAL stainless steels shown on the Selector are carried in stock in Crucible warehouses conveniently located throughout the country.

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HOW THE SELECTOR WORKS:

Start with the problem. For example, resistance to corrosion in contact with copper sulfate. Just set the slide at the proper index number shown on the Selector (in this case on the back), and you have the answer in a second – grades 302 and 316 are fully resistant to this form of attack.

Crucible Steel Company of America
Dept. S, Henry W. Oliver Building
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Name _____

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CRUCIBLE first name in special purpose steels

54 years of Fine steelmaking

STAINLESS STEELS

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

REX HIGH SPEED • TOOL • REZISTAL STAINLESS • MAX-EL • ALLOY • SPECIAL PURPOSE STEELS

Manganese Output Rises

Knoxville plant attains full capacity production of high-purity electromanganese

ELECTRO MANGANESE CORP.'s Loraine street plan in Knoxville, Tenn., reached rated capacity production last December and is now operating satisfactorily. It was erected to manufacture electromanganese in the form of cathode chip of plus 99.9-per-cent purity. The first pound of metal was produced in the plant on Nov. 11, 1953.

The plant doubles the nation's supply of electrolytic manganese, which was formerly 10 tons per day and supplied solely by the company's Proctor street plant in Knoxville.

Applications — Electromanganese has important applications in the production of stainless steels, bronzes, aluminum alloys and pure chemicals. Of increasing importance is the consumption of this metal by the titanium industry for alloying purposes.

The Loraine street plant, costing about $10 million, was built at the request of Defense Materials Procurement Agency, Washington, with the assistance of a government loan. It will provide an increased supply of pure manganese for the new and rapidly developing family of chromium-manganese-nickel stainless steels.

Harvester Firm Builds Plant

International Harvester Co. of Canada Ltd., Hamilton, Ont., has completed a modern engineering building costing more than $750,000. It contains more than 26,000 sq ft of drafting rooms and experimental workshops.

Retools Buffalo Plant

Buffalo Division of Twin Coach Co., Kent, O., is tooling for production of airplane parts. Center panels and wings for the Grumman S-2F and "massive components" for the B-52 will be built at the plant.

U. S. Steel Forms Subsidiary

United States Steel Corp., Pittsburgh, formed a new subsidiary which will offer mortgage financial assistance to builders of homes prefabricated by United States Steel Homes Inc., New Albany, Ind. The new organization will be in operation about Apr. 1.

Bathgate Foundry Opens Plant

Bathgate Foundry Co. opened its new plant and offices at Creeper Hill road, North Grafton, Mass.

Bestobell To Build in Canada

Bestobell Ltd., Toronto, Ont., a subsidiary of Bell's Asbestos & Engineering Ltd., England, will construct a factory building with 10,000 sq ft of floor space in Toronto, Ont. Bestobell makes magnetic level controls, steam and hydraulic valves and other products.

Parker Appliance Names Agent

Parker Appliance Co., Cleveland, appointed Sterling Packing & Gasket Co. Inc., Houston, as a distributor of its O-rings. Parker is a producer of hydraulic and fluid system components for industrial machines and processes.

Aerovox Constructs Plant

Aerovox Corp., Los Angeles, completed construction of a $900,000, 51,500-sq-ft office and factory building for production of electronic equipment. The plant will be shared by Acme Electronics, a subsidiary.

Canadian Firm Changes Hands

L. E. Waterman Co. Ltd., Montreal, Que., was sold to a group of Canadian investors headed by Savard, Hodgson & Co. Inc. The company will operate under a license arrangement for use of patents and trademarks of the Waterman Pen Co. Inc., New York, the former owners.

Forms G. S. Equipment Co.

G. S. Equipment Co. was organized to serve the metal finishing industry with new equipment of its own design and manufacture, as well as other national makes. It was organized by officers and directors of General Supply Co.,

(*Please Turn to Page* 81)

Texas Gets Its First Integrated Aluminum Facility

Unique new alumina plant on Corpus Christi bay in south Texas has been completed and is in operation with a rated output of 1000 tons of alumina daily. Called the LaQuinta plant, it is operated by Reynolds Reduction Co., a subsidiary of Reynolds Metals Co., Louisville. Bauxite is unloaded at the pier (foreground) by belt conveyors. With Reynolds Metals' huge San Patricio reduction plant (background), it gives Texas a fully integrated ore-to-aluminum operation

Slab REHEATING Furnaces

TWO TRIPLE-FIRED, END CHARGED, END DISCHARGED, CONTINUOUS REHEATING FURNACES INSTALLED BY RUST IN A PENNSYLVANIA HOT STRIP MILL

heat 160 tons of cold steel slabs per hour

The whole job is ONE job with a RUST PACKAGE CONTRACT

One contract covers everything . . . from blueprint through start up. Rust assumes responsibility for design, manufacture, erection, and is prepared to undertake all phases of the work with its own forces, including wiring and piping. This results in substantial savings . . . One profit instead of pyramiding ones which accrue where many subs are employed.

The outstanding feature of these Rust Furnaces is the completely automatic temperature and combustion control, with easy operation from a centrally located panel board. Slabs are heated in two triple-zone gas furnaces. Burners at top and bottom heat slabs to rolling temperature at a rate of about 160 tons of cold steel per hour (80 tons per furnace). Furnace temperature ranges from 1650 F. at the entry end to about 2400 F. at the discharge end.

Flexibility is achieved by simply changing the fuel firing rate in the heating zone. The result is HIGH TONNAGE OUTPUT with MINIMUM FUEL CONSUMPTION. Aiding this high capacity and economy of operation are Rust Recuperators which preheat the air for combustion. This type of Rust Furnace is used by virtually all of the strip mills in the world. Rust also builds all other types of metallurgical heating furnaces (designed for any fuel). For either new or modernization projects let Rust quote on your requirements.

Rust Furnace Company

Pioneers in Furnace Design

Rust Building • Pittsburgh, Pa.

F-11

CAMERA SHUTTERS METAL BAND SAWS SURGICAL INSTRUMENTS, ETC. CIGARETTE ADVICES

VIBRATOR REEDS DOCTOR BLADES

Some "Character References" for Sandvik Spring Steel Quality

TEXTILE MACHINE PARTS

RAZOR BLADES FEELER GAUGES PISTON RING SEGMENTS AND EXPANDERS

BUTCHER BAND SAWS SPRINGS, NEEDLES, ETC.

COMPRESSOR VALVES A WIDE VARIETY OF SPRINGS

CLOCK AND WATCH SPRINGS WOOD BAND SAWS

TROWELS SHOCK ABSORBERS

RIVETS KNIVES

On this page are some of the tough applications Sandvik Steels are now successfully handling. They are the best kind of testimonial for the "character" . . . the inherent high quality of Sandvik spring steel.

Each of these applications demands its own special combination of high fatigue life, fine surface finish, accurate and uniform size and special physical properties. In every case, one of Sandvik's wide variety of steels fits the requirements to a "T".

If you feel that a better spring steel would improve *your* product, why not check with Sandvik.

Sandvik Swedish specialty strip steels are available:

- **In specialized analyses for specific applications.**
- **Precision-rolled in thicknesses to fit your requirements.**
- **In straight carbon and alloy grades.**
- **Annealed, unannealed or hardened and tempered.**
- **Polished bright, yellow or blue.**
- **With square, round or dressed edges.**
- **Wide range of sizes in stock — also slitting facilities available.**

Talk over your spring steel application with a Sandvik spring steel specialist. No obligation, of course.

SANDVIK STEEL, INC., 111 EIGHTH AVE., NEW YORK 11, N. Y.
WAtkins 9-7180
230 N. Michigan Ave., Chicago 1, Ill., FRanklin 2-5638
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SANDSTEEL SPRING DIVISION • New York • Industrial Springs
SANDVIK SAW & TOOL DIVISION • New York • Saws and Tools

(*Continued from Page 78*)

5317 St. Clair Ave., Cleveland, and has taken over all equipment sales formerly handled by that firm.

Adamas Names Representatives

Adamas Carbide Corp., Harrison, N. J., manufacturer of standard carbide tools, tool tips, dies and wear parts, appointed additional representatives. These include D. A. Olson Co., Seattle; C. W. Davidson Co., Indianapolis; and E. W. Keir Co., Milwaukee.

Ziegler Enlarges Warehouse

Ziegler Steel Service Corp., steel distributor, Los Angeles, is doubling in size its plant and office in that city. The company carries sheet, strip, bars and shapes for commercial and aircraft requirements.

Gundlach Mfg. Changes Hands

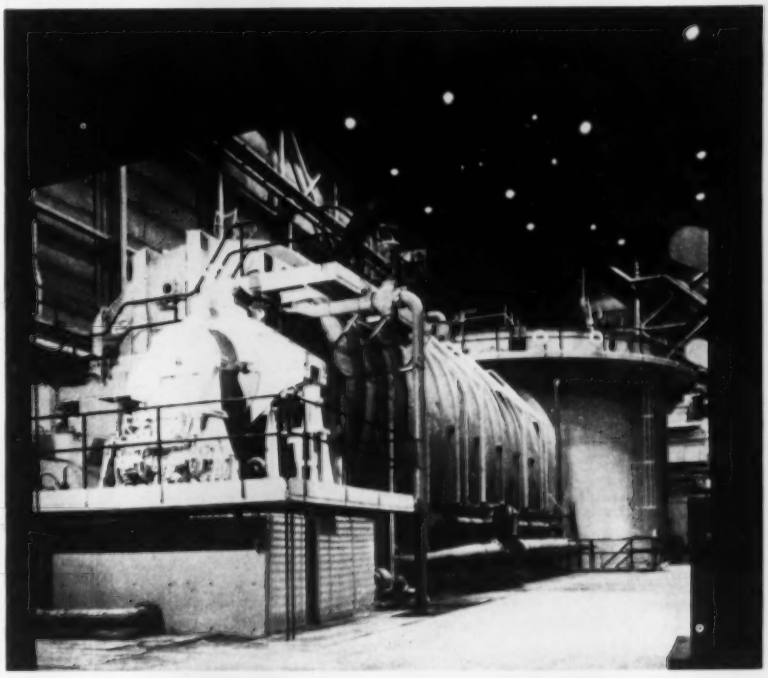
Gundlach Mfg. Corp., Fairport, N. Y., has been sold to Albert Drucker, Chicago engineer. Gundlach makes studio type cameras and lenses. Albert Von Wiegen, head of Gundlach, plans to retire. Mr. Drucker plans to reorganize and modernize the Fairport plant, concentrating on manufacture of custom-built camers, lenses and equipment for both civilian and military use.

Opens $2-Million Addition

The $2-million addition to the Hampstead, Md., branch of Black & Decker Mfg. Co., Towson, Md., for which ground was broken last spring (STEEL, May 18, p. 85) has been erected and is beginning operation. This addition covers 126,000 sq ft and more than doubles the size of the original Hampstead plant, says Alonzo G. Decker, president. Punch press, sheet metal, forging, field and stator winding and large tool assembly now will be able to expand.

Kodak Builds Plant Addition

Construction work on a $713,750 addition to a manufacturing building in Kodak Park, Rochester, N. Y., is now under way. The addition will have about 160,000 sq ft of floor space and is scheduled to be ready for production purposes within two years. The addition will be part of a main building used by Eastman Kodak Co. for the manufacture of metal and plastic spool, reels and film cans.



Indoor "Submarine" Contains First Atomic Engine

Inside the hull of this "indoor submarine" is the first atomic engine ever to produce substantial quantities of power. Built by Westinghouse Electric Corp., Pittsburgh, in co-operation with AEC's Argonne National Laboratory, this nuclear power plant was built for long-range testing and operation. It is a prototype of the actual engine installed in *U. S. S. Nautilus*. This view of the first atomic engine, located at National Reactor Testing Station, Idaho, shows the aft end of the hull and the large "sea tank" which surrounds the reactor compartment

Plans Toronto Factory

Smith Bros. Motor Bodies, Toronto, Ont., will erect a plant with 32,000 sq ft of floor space in that city. The company makes specialized truck bodies.

Pratt Industries Plant Closed

Pratt Industries Inc.'s plant in Frankfort, N. Y., has been sold and operations will be discontinued at that location. Arnold H. Maremont, president, Maremont Automotive Products Inc., Chicago, says his company has purchased Pratt Industries, a subsidiary of Formed Tubes Inc., Sturgis, Mich. Mr. Maremont said his company will close the Pratt plant and make its mufflers and spiral tubing in Chicago.

Abrasives Firm Moves

Ace Abrasive Laboratories consolidated its operations in its own building at 35 Roselle St., Mineola, N. Y. The company makes diamond wheels, tools, powders and compounds.

Vibrator Firm Names Agent

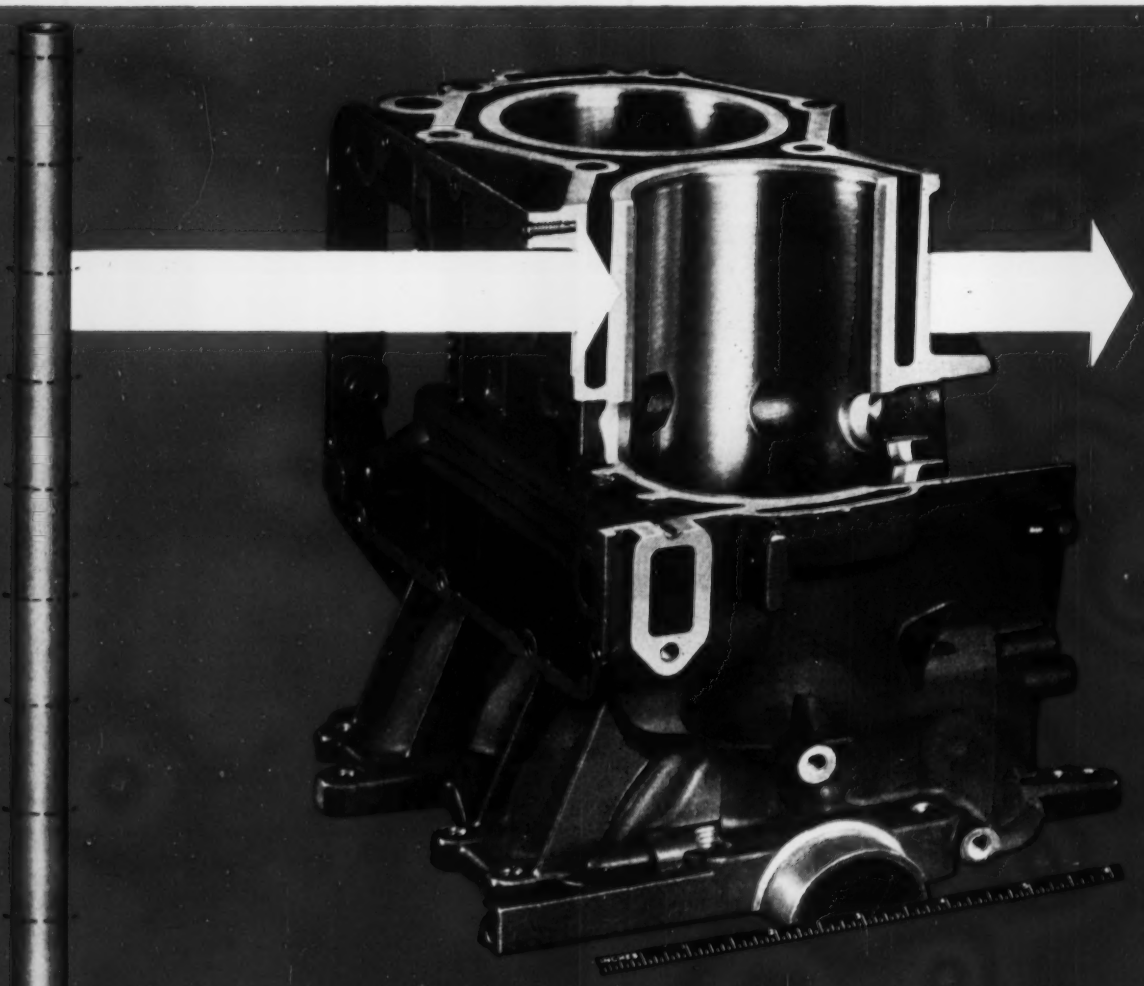
Cleveland Vibrator Co., Cleveland, appointed Industrial Vibrator & Machinery Co., San Francisco, as its West Coast distributor.

Morris Motors Buys Plant

Morris Motors of England announced incorporation of a Canadian company at Hamilton, Ont., under the name of Morris Motors (Canada) Ltd., preparatory to

(*Please Turn to Page 84*)

IT TAKES QUALITY IN EVERY PART TO BUILD THE STAMINA



Centrifugally cast iron tubing as supplied by U. S. Pipe.

Cut-away view showing iron cylinder liners die cast in aluminum block.

UNITED STATES PIPE & FOUNDRY CO.

Special Products Division

BURLINGTON, NEW JERSEY

SALES OFFICES: LOS ANGELES, CHICAGO, ST. LOUIS, CLEVELAND, DETROIT, PITTSBURGH, BURLINGTON

AN OUTBOARD NEEDS

Finished Johnson Sea Horse, with auxiliary fuel tank for extended running periods.

Serving in increasingly heavier duty roles—involving longer periods of operation *and* higher power ratings, Johnson outboard motors today stress durability above light weight and portability. At the critical wear points, Johnson carefully selects materials which will give rugged, dependable service.

U. S. Pipe is proud to have been chosen to provide centrifugally cast "mechanical tubing" in iron for Johnson's cylinder liner requirements

The advantages of long length centrifugally cast liner stock are many—dense grain structure—excellent machinability on high output automatic screw machines—reduced clean-up allowances for final finish.

In addition to cylinder liner applications, U. S. Pipe small diameter iron tubing is the choice of quality-minded producers of piston rings, drill press columns, bushings, heat exchanger tubing and chemical piping.

Small diameter iron tubing is just one of four major cylindrical product groups made by our Special Products Division. Larger diameter gray and alloy irons, carbon, alloy and stainless steels and Dual Metal Combinations up to 14 ft. in length and 30" diameter are also produced for every major American industry.

Write today for more information on these versatile specialty products.

SMALL DIAMETER CENTRIFUGAL CASTINGS
"MECHANICAL TUBING" IN IRON

SIZE RANGE AND COMPOSITION FLEXIBILITY

OUTSIDE DIAMETER—1½" TO 6"

WALL THICKNESS—¼" NOMINAL AND UP

LENGTH—Up to 10' in "as-cast" condition

NOMINAL CLEAN-UP ALLOWANCES—.060" minimum cut depth, O.D. and I.D.

TYPES OF METAL CAST—Gray and Alloy Iron—all standard and special analyses, including Hi-Hard and Hi-Duty

(Continued from Page 81)

wider development of the Canadian market. Capital investment of the new company has been authorized at $1 million. The firm acquired a plant and equipment in Hamilton. L. P. Lord is president of the new company.

Ryerson Moves Branch Plant

Joseph T. Ryerson & Son Inc., Chicago, moved its Milwaukee operations to a larger plant at 500 S. 88th St. Steel service facilities at the plant, containing about 170,000 sq ft of floor space, include much new equipment for sawing, shearing and flame cutting of steel to customers' requirements. W. F. Kurfess is plant manager.

KSM Appoints Distributor

KSM Products Inc., Merchantville, N. J., manufacturer of welding studs and stud welding equipment, appointed S & S Industries Inc., Houston, as a distributor.

Royal Heaters Changes Name

Royal Jet Inc., Alhambra, Calif., manufacturer of gas heating equipment and jettisonable fuel tanks, is the new name for Royal Heaters Inc.

Buys Silica Property

Carborundum Co. acquires American Tripoli Corp., owner of silica deposits in Missouri

CARBORUNDUM CO., Niagara Falls, N. Y., will acquire the capital stock of American Tripoli Corp., Seneca, Mo., owner of deposits of an unusual form of silica found in the foothills of the Ozark mountains.

This nonmetallic mineral is double refracting and of the chalcedony variety. It is soft, porous, and has a fibrous structure with no sharp edges or corners and average particle size of less than 0.01 mm.

Marketed as Seneca Standard Tripoli, it is highly absorptive and binds firmly with stearic acid, tallow, paraffin, petrolatum, and oils with which it is mixed in various formulations.

Uses — Applications include buffing and polishing compounds, lacquer finishing compounds, metal polishers, foundry parting, detergents, cleaners and polishing cloths. Research is presently developing additional uses for this mineral as a catalyst carrier in petroleum cracking and other industries.

"The purchase of American Tripoli Corp., closely related to the abrasive industry, is a further extension of Carborundum's policy of diversification into kindred lines of the parent firm," says Gen. C. F. Robinson, president.

Titeflex Opens Detroit Office

Titeflex Inc., Newark, N. J., opened a sales office at 1249 Washington Blvd., Detroit, in charge of Edward Frank. The company makes metal hose, metal bellows, electrical connectors, electrical fuses, rigid and flexible wave guides, ignition harnesses and shielding systems.

Equipment Firm To Build

G. A. Harvey & Co. Ltd., London, England, will erect a plant in Toronto, Ont. The plant will house the assembly and finishing operations of the firm's steel office equipment department.

Bausch & Lomb To Close Plant

Bausch & Lomb Optical Co., Rochester, N. Y., will close its plant in Wellsville, N. Y., in April. The unit manufactures frames for eyeglasses. The plant was opened in 1947 as part of a postwar expansion program.

Builds Plant in Ontario

Ground has been broken for the new $500,000 plant of Provincial Engineering Ltd. in Niagara Falls, Ont. The plant will contain 40,000 sq ft of floor space. It will be used for the manufacture of electric substations and will have a large galvanizing tank.

Selas Forms Subsidiary

Selas Corp. of America, Philadelphia, formed a subsidiary, Selas Constructors Inc., Houston. F. O. Hess is president of both corporations. Clare Construction Co., Houston, was acquired as the nucleus of the new firm. Purpose of Selas Constructors is to facilitate fabrication, erection and service of Selas Corp.'s designs and developments for the petroleum and petrochemical industries of the Southwest.

Marion Shovel Sets World's Record for Earth Removal

This all-electric shovel, powered and controlled by equipment made by General Electric Co., Schenectady, N. Y., moved 1,622,883 cu yd of overburden in the bituminous coal fields of southeastern Ohio last October, establishing a record. The Marion 5561 shovel, in about 15 seconds, swings some 70 tons of overburden a distance of 240 ft to spoilpiles at levels as high as a 10-story building

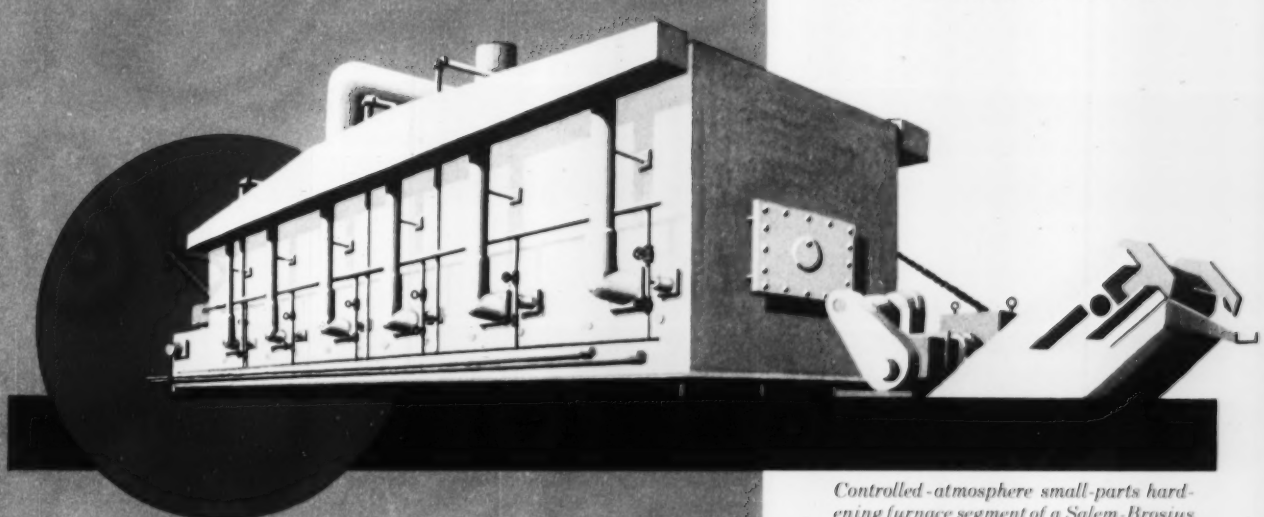
Salem-Brosius has a

bad habit

that means profit to you!

Salem-Brosius has the unfortunate habit of going to the extra trouble of engineering more quality into its furnaces than the application might indicate. Unfortunate for Salem-Brosius, but fortunate for you. Prices being equal, you, as a customer, can hardly lose from an extra measure of good design and sturdy construction that assures you greater production, longer life, and easier operation.

Take the case of the controlled-atmosphere small-parts hardening furnace shown here, for which Salem-Brosius is justifiably well-known. Users find that fast precise heating, complete atmosphere control, and rapid and high capacity materials handling mean better production. Why not take advantage of our bad habit of extra quality. Send us an inquiry for this or any other type of heat-treating furnace now.

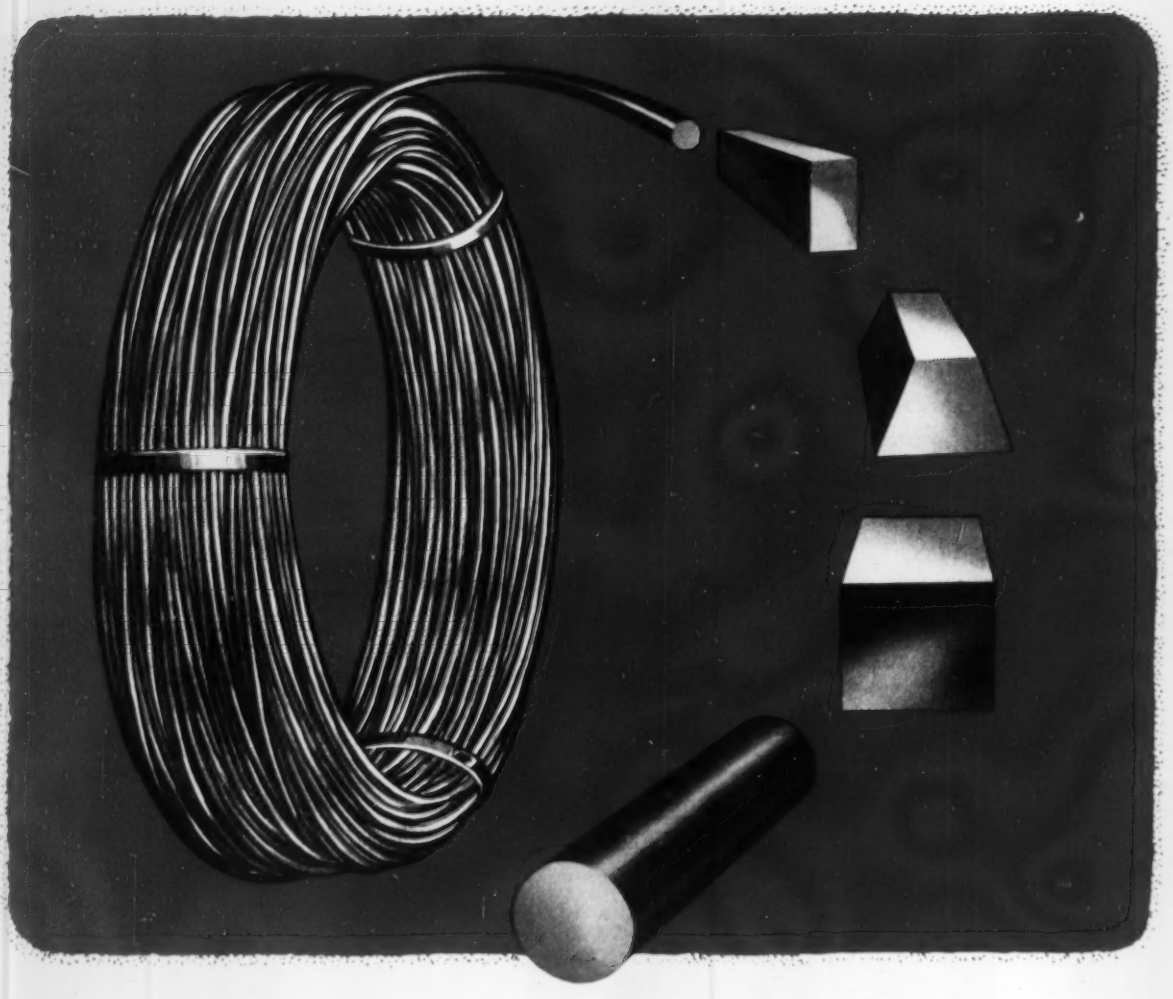


Controlled-atmosphere small-parts hardening furnace segment of a Salem-Brosius harden, quench and draw line.

SALEM-BROSIUS, INC.

Sales and Executive Offices: 248 Fourth Avenue, Pittsburgh 22, Pa.

For Your Steel Requirements!



Specify Reliance SPECIAL STEELS

Steel purchasers can't guess . . . they've got to know absolutely that the steel they specify will meet particular requirements. Too much is at stake in the manufacture of any product to permit guesswork on the quality of steel from which the product is being made. It is this quality that determines the excellence of the final result.

That is why we, at Reliance, can place our modern plant at your service to provide special quality steels to meet your specifications. Our cold finished steel, produced on modern equipment by experienced personnel, must meet rigid inspection and quality control checks during every step of production by our chemical and metallurgical laboratory staff. Our steel in rounds, squares, flats or special shape sections in wire sizes .020 x .020 x ½ to ⅜ in coils or cut to length all undergo rigid Eaton Reliance inspections regardless of type: cold drawn, cold rolled, centerless ground, carbon, alloy, stainless, K-Monel, bronze or aluminum.

Our steel mill produces ball and roller bearing quality, key stock, cold heading quality spring steel whose surface tolerance, physical specifications and machineability must meet specific requirements. Let us help cut your production costs with fine quality steel. Write for further information.

RELIANCE DIVISION EATON MANUFACTURING COMPANY

OFFICE and PLANTS: 514 Charles Ave., S. E., MASSILLON, OHIO

Springlites & Sems · Snap & Retaining Rings · Special Steels · Spring Lock Washers · Hot Forgings

SALES OFFICES: New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Montreal

Technical Outlook

TITANIUM DEFICIT— Air Force needs at least 14,800 tons more than it is getting annually. In 1953, 2300 net tons were available. By 1955, expected availability will be 7200 tons, instead of the 22,000 tons actually required by the expansion program. Office of Defense Mobilization has assigned the problem to National Academy of Sciences—find a production method that is better than the Kroll process.

ATOMIC BEER— Pasteurization of beer by atomic radiation is being explored by Reynolds Metals Co. in co-operation with the University of Michigan. A Reynolds spokesman stated that aluminum may prove to be the most practical material for beer cans, bottle crowns and barrels if the process works out.

UNDER WATER— Navy's first atom-powered sub, the U.S.S. Nautilus, has ceramic-coated exhaust system parts that are expected to outlive organic coatings six to eight times. The porcelain enamel coating was developed by Ferro Corp.

BIGGER PAYLOADS— Magnesium truck bodies are said to offer large volume capacity in relation to body weight. For example, a 12-foot, van-type body (complete with roof and doors) has a capacity of 621 cu ft. Weight is only 850 pounds. White Metal Rolling & Stamping Corp., Brooklyn, makes the bodies.

BATTERY NEWS — Performance of lead-acid storage batteries (with additions of sodium and sulfuric acid solutions) was discussed recently before the AIEE in New York. One of the points made: "Addition of sodium and magnesium sulfates to sulfuric acid electrolytes of low specific gravities has an apparent beneficial effect on the discharge of partially redeveloped 'sulfated' plates. But cycling effect disappears as specific gravity increases. Mixtures of sodium and magnesium sulfates adversely affect discharges of partially redeveloped 'sulfated' negative plates at high rates for acid specific gravity over the range of 1.020 to 1.200."

AUTOMATIC CHEMIST— An instrument that controls the mixture of multi-component gases or light liquids in a stream has been developed by General Electric. Called an ion-resonance, mass spectrometer, it is expected to be translated into such advances as better quality plastics and synthetics at lower cost. They say it can do in minutes what would take a chemist hours or even days.

TITANIUM CASTINGS— First non-exclusive license on National Research Corp.'s titanium shape casting process has been granted to Titanium Casting Corp., division of Howard Foundry Co., Chicago. Process entails special melting furnaces, casting procedures and mold materials that withstand the attack of the molten metal.

ULTRASONICS— Ultrasonic instrument for nondestructive testing of certain nonmetallic solids has been announced by Reed Research Inc., Washington. Called the Acoustigraph, it is said to produce high contrast records of simulated flaws or mechanical defects that are imperceptible in x-ray photographs of the same sample. Record may be interpreted in the same manner as a positive radiograph.

TWO-IN-ONE— Machine that flame cuts and hardens heavy duty gears and sprockets has been developed by Cogmatic Co., Milwaukee. A refinement of an earlier model used primarily for cutting, it has a water quenching spray that is applied immediately after cutting.

Metalworking Outlook—p. 37 Market Outlook—p. 143

Chase Brass & Copper Co.

This mill produces brass sheet. In this case, sheet is reduced from 0.360 to 0.100 inch in four passes

HOW TO CLASSIFY

Copper Base Alloys

Most wrought, copper-base alloys fall into a few groups: They include coppers, nonleaded, leaded, tin and aluminum brasses, phosphor and silicon bronzes and nickel-bearing alloys

MILLS producing copper-alloy products in wrought form have hundreds of compositions on their mixture lists; copper, zinc, tin, lead, nickel, iron, phosphorus, arsenic, manganese, silicon and other elements have been specified—along with details of processing, to meet real or fancied demands of the great army of consumers. A first step toward standardization has been taken by the Copper and Brass Research Association.

In its Book of Standards, the association has listed the more important wrought copper-base alloys. Groups include: Two coppers, seven plain or nonleaded brasses, 12 leaded brasses, five tin and aluminum-bearing brasses, four phosphor bronzes (tin bronzes), three nickel-bearing alloys and two silicon bronzes—a total of 35.

Those groups certainly account for the great preponderance of wrought copper alloys; in fact, the mere listing of them has accomplished something in the direction of simplification and economy.

Common Ground—Most alloying elements have considerable solid solubility in copper. This constitutional condition is particularly effective in producing useful modifications of the base metal; and a great number of copper alloys with a wide range of strength properties, corrosion resistance and other advantages would be anticipated.

With copper and nickel, solubility is complete from one metal to the other. At the copper end is a group of useful copper-nickel alloys knows as cupro-nickels and the coinage alloys; they commonly use about the quanitity of nickel needed to decolorize copper (25 per cent).

Next to nickel, the metal that dissolves most freely in solid copper is zinc. The solid solution is known as alpha brass. When less than about 61 per cent copper is in the alloy at ordinary atmospheric temperatures, the saturation point is reached; further addition of zinc introduces a second structural constituent known as the beta solid solution.

From about 61 per cent down to about 54 per cent copper, alloys are intimate mixtures of these two constituents. These mixed alpha-beta brasses have properties that distinguish them from the alpha brasses.

Tendency to form intermediate solid solution is also found in other copper-base alloys. Each represents a particular kind of crystal structure determined by the interplay of atomic forces in a certain range of composition. Alpha solution founded on the crystal structure of copper itself is always of greatest importance; often other alloys do not possess useful properties.

Bronzes—This is not quite true of the copper-tin alloys—universally known as bronzes. They contain over 16 per cent tin, which is the extreme quantity that can be taken into the alpha solution. They are used for castings and are characterized by rather high strengths, even though lacking in plasticity. Constitutional conditions of the alpha solution also permit beneficial changes by heat treatment.

By far the majority of the bronzes are alpha solutions; and presence of tin so affects plasticity that only the more dilute of these solutions—say up to 8 or 10 per cent tin—are commonly encountered in wrought alloys.

Wrought Copper Alloys—Alpha brasses as a group are endowed with one fundamental property of great importance: Their plas-

Adapted in part from the chapter on copper in *Modern Uses of Nonferrous Metals*, by Dr. D. K. Crampton, director of research and development, Chase Brass and Copper Co., Inc., Waterbury, Conn. Work was recently published by the American Institute of Mining and Metallurgical Engineers, New York.

This is the first of three articles on the subject. Next installment on Feb. 8 will take up properties, such as machinability, formability, corrosion, temper control and grain size. Last, to appear on Feb. 15, will deal with casting alloys.

ticity in cold-working is unattained by other alloys cheap enough and strong enough to serve as a generally useful engineering material of construction.

Obviously, since zinc is cheaper than copper, the composition ordinarily used for the many familiar objects (rolled, drawn, stamped and spun from the yellow brasses) contains something near the maximum allowable percentage of zinc. Some years ago the alloy known as common high-brass—now preferably called yellow brass—was used in greater quantities than any other in this series. It contains 65 per cent copper, 35 per cent zinc.

With the strong trend toward hot-rolling as a basic procedure for the making of strip, 65-35 has been largely supplanted by 70-30 or cartridge brass. Producers and fabricators have learned that the many minor variations of alloys, including 65, 66 2/3, 67, 68, 70, 71, 72, and 75 per cent copper, have no practical significance; so it seems probable that in years to come the 70-30 alloy will be used substantially to the exclusion of others in this range.

Hue—Color of brasses varies widely with the composition. When increasing amounts of zinc are added to copper, the brasses range from copper red, which persists at about 5 per cent zinc through a bronze color at about 10 per cent; a golden color at about 15 per cent; and increasing dilution of color to the typical brass yellow at around 30 per cent of zinc. With more than 38 per cent zinc (available only in rod form) the alloy returns to the buff red cast.

This question of color is tremendously important in some applications — particularly costume jewelry, fasteners, fuse boxes and architectural trim. In the 80 to 90 per cent copper range, color changes rapidly; and for such uses, a given nominal alloy must be held within rather narrow limits, so assembly parts do not show color variations.

Red brass, containing 85 per copper, is, next to cartridge brass, the most important of the non-leaded brasses; is produced in large quantities in all common forms; and is particularly suited for plumbing pipe (because of high resistance to aqueous corrosion) and a host of manufactured

These 2000-pounders were made on continuous bar casting machine at Scovill Mfg. Co. of Waterbury, Conn.

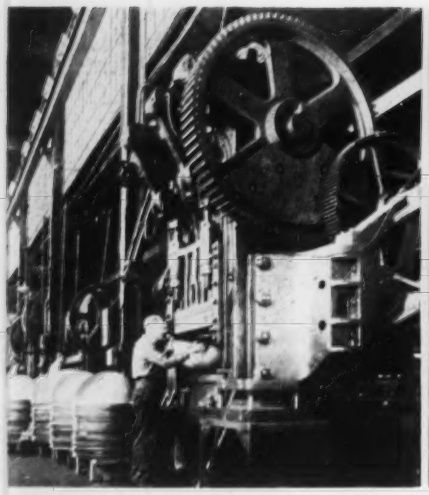
HIGH-ZINC BRASSES

ALLOY	Nominal Composition (Per cent) Copper	Zinc	Cold Working Capacity	Hot Working Capacity	Forms	Nearest Applicable ASTM Specification	Tensile Strength Range* (psi)	Machinability Rating
Cartridge Brass, 70%	70	30	Excellent	Fair	Flat	B 36, Alloy 6	44,000— 99,000	
					Wire	B 134, Alloy 6	48,000—130,000	
					Tube	B 135, Alloy 2	47,000— 78,000	
					Rod		48,000— 70,000	30
					Flat	B 36, Alloy 8	46,000— 91,000	
Yellow Brass	65	35	Excellent	Poor	Rod		48,000— 55,000	30
					Wire	B 134, Alloy 7	50,000—128,000	
					Flat		54,000— 70,000	
Muntz Metal	60	40	Fair	Excellent	Rod		52,000— 72,000	40
					Tube	B 135, Alloy 5	56,000— 74,000	

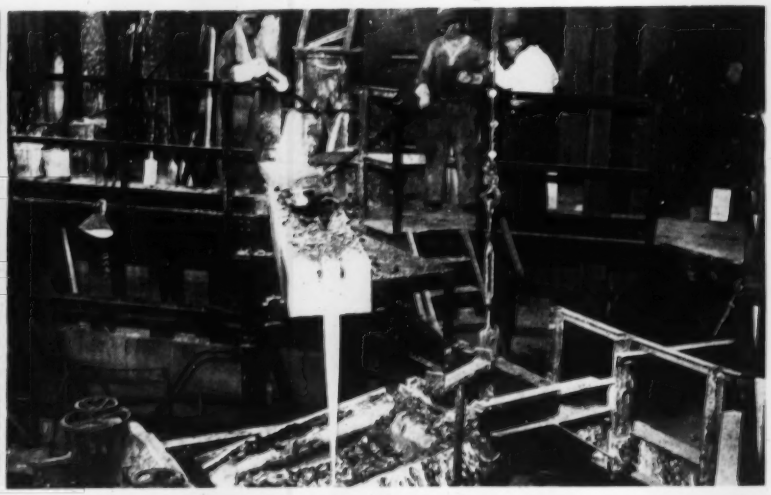
LOW-ZINC BRASSES

Gilding, 95%	95	5	Excellent	Good	Flat	B 36, Alloy 1	34,000— 64,000	
					Flat	B 36, Alloy 2	37,000— 72,000	
Commercial Bronze, 90%	90	10	Excellent	Good	Wire	B 134, Alloy 2	40,000— 90,000	
					Tube		38,000— 60,000	
					Rod		40,000— 45,000	20
					Flat	B 36, Alloy 3	39,000— 84,000	
Red Brass, 85%	85	15	Excellent	Good	Wire	B 134, Alloy 3	41,000—105,000	
					Tube	B 135, Alloy 1	40,000— 70,000	
					Pipe	B 43	— 44,000	
					Flat	B 36, Alloy 4	42,000— 91,000	
Low Brass, 80%	80	20	Excellent	Fair	Wire	B 134, Alloy 4	44,000—125,000	

* Average values depending on temper. These values should not be used for specification purposes



Heavy stampings of copper and its alloys are turned out on these presses at General Metal Products Co.



Copper cakes, from 1800 to 3000-pounds, are molded at Anaconda's Raritan Copper Works at Perth Amboy, N. J.

DEFINITIONS OF ALLOYS USED IN COPPER AND BRASS MILL PRODUCTS INDUSTRY

COPPER: The element copper, commercially pure or alloyed, with not more than 1% of other elements. The term "copper" is generally modified to indicate either its method of production or the alloying material. Typical examples are:

Electrolytic Tough Pitch Copper
Deoxidized Copper
Oxygen-free Copper
Fire Refined Copper
Silver-bearing Copper
Phosphorized Copper
Tellurium Copper
Selenium Copper
Leaded Copper

BRASS: An alloy of copper with zinc as the principal alloying element, with or without small quantities of some other elements.

Gilding, 95%
Red Brass, 85%
Low Brass, 80%
Cartridge Brass, 70%
Yellow Brass
Muntz Metal
Forging Brass
Naval Brass
Aluminum Brass

Some Brasses, because of their appearance or because of some particular property, are commercially called bronzes, for example:

Commercial Bronze, 90%
Leaded Commercial Bronze
Architectural Bronze
Manganese Bronze

Brasses to which lead has been added to improve machinability are known as "Leaded Brasses" and include the following:

Low-leaded Brass
Medium-leaded Brass
High-leaded Brass
Extra-high-leaded Brass
Free-cutting Brass
Leaded Muntz Metal
Free-cutting Muntz Metal

The alloy commercially known as "Nickel Silver" is a Brass in which the element nickel has been substituted for part of the zinc. Where two numerals appear after the name, they indicate the percentage of copper and nickel, respectively. For example:

Nickel Silver, 55-18
Nickel Silver, 65-15
Leaded Nickel Silver, 61.5-12
Extruded Leaded Nickel Silver

BRONZE: Originally, the term for copper alloys having tin as the only or principal alloying element. In modern usage, the term "Bronze" is seldom used alone, and the terms "Phosphor Bronze" or "Tin Bronze" are considered preferable for indicating the copper-tin alloys. Thus:

Phosphor Bronze, 5%
Phosphor Bronze, 8%
Free-cutting Phosphor Bronze

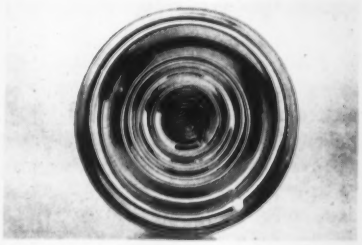
The term "Bronze" suitably modified has been extended to apply to any of a variety of copper-base alloy systems, particularly where the element alloyed with the copper is present in not much more than 10%. For example:

Aluminum Bronze (Copper with aluminum as the principal alloying element)
High Silicon Bronze (Copper with silicon as the principal alloying element, with or without small percentages of other elements)
Low Silicon Bronze (Similar to High Silicon Bronze but with less silicon)

These usages for the term "Bronze" have gained widespread acceptance. This, of course, excludes the Brasses which include the word "Bronze" in the title but which, by definition, are actually Brass. (See Brass.)

CUPRO-NICKEL: Cupro-Nickel, an alloy of copper and nickel with the nickel content usually being 10, 20 or 30 per cent, does not fall readily into any of the foregoing definitions.

Copper & Brass Research Association



American Brass Alloy was used here to form attractive automobile hubcap

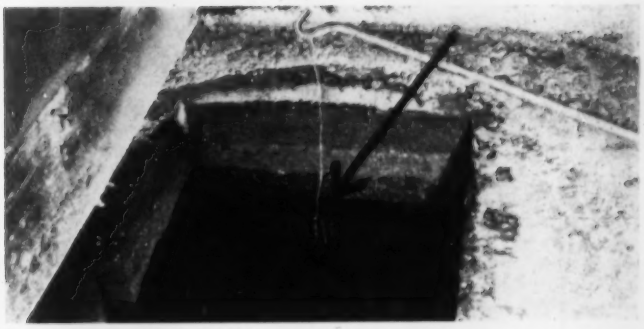
parts that combine ductility, good fabricating properties, golden color and ease of polishing.

A 90-10 mixture, known as commercial bronze because of its color, is used for a host of things, such as angles, channels, costume jewelry, etching bronze, grille work, hardware, projectile rotating bands, screen cloth, screws and rivets.

Hot Work—Group of brasses containing alpha and beta solid solution is represented by the 60-40 mixture; its original name, Muntz metal, has come to mean anything in the group covering 61 to 54 per cent copper. Muntz metal, compared to the plain alpha brasses, is extremely plastic at red heat, followed by conditions tending in the opposite direction when cooled to room temperature.

These alloys can be hot worked easily and drastically by rolling, extrusion and other methods, but they are not suitable for severe-cold-working.

Razor Blade Test For Decarb



Razor blade (arrow) is immersed in a molten bath for 10 or more minutes at a given temperature. Then it is quenched

If the blade bends, the carbon has been depleted. However, if the blade is brittle and breaks, the bath tests out as neutral

Furnace operating personnel can make this test on the spot without calling in lab technicians. Time and special equipment usually involved are no problems here

YOU can check for decarb with a discarded razor blade if you are a salt bath furnace user.

Simply immerse the blade in the molten bath for the prescribed time (10 or more minutes) at a given temperature; then give it a quick water quench.

If the blade bends, carbon has been depleted; the salt bath shows evidence of decarburizing and should be rectified immediately. If the blade snaps, the bath is neutral.

Because of the thinness of the blade, this test, said to be foolproof, is extremely sensitive to an oxidizing bath. Ductility of the quenched blade determines partial or complete decarburization.

Why Test — Decarburization of a steel surface is one of the first signs of trouble. Loss of surface carbon, with a corresponding drop in surface strength, seriously reduces fatigue resistance — by as much as 40 per cent in combination with surface defects, such as pits, marks, scale and oxide.

Steel billets and bars are usually in a decarburized condition as received from the mill; and constant vigilance is required during fabrication to remove this decarb and avoid further carbon loss during heat treatment.

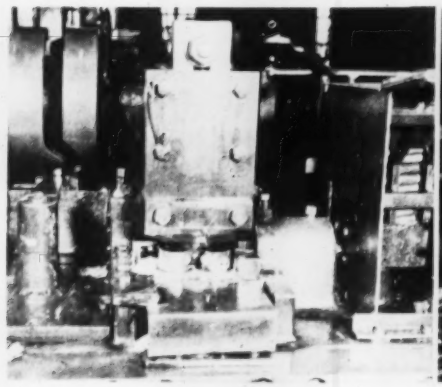
Heat Treatment—For years, use of neutral, salt-bath furnaces has been recognized as one of the simplest methods of heating steel without surface attack.

Work immersed in a neutral salt bath furnace is sealed off from oxidation by air. Surface of the part is further protected by a film of liquid salt as it is withdrawn from the neutral salt bath, enroute to the quenching medium.

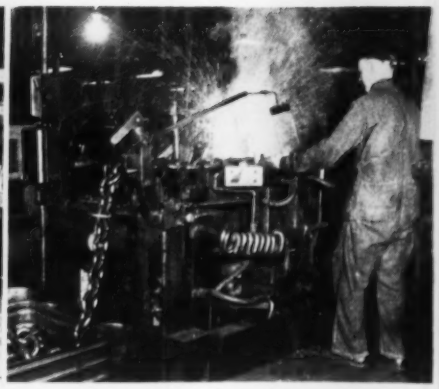
Other Methods — Conventional tests for decarb (such as macro, fracture, chemical analysis and file tests) are usually time consuming and may require the use of special equipment.

A number of salt bath furnace users report they have used the razor blade test with success. They point out that the check can be made by furnace operating personnel without involving laboratory-trained technicians.

Test was recently announced by Ajax Electric Co. Inc., Philadelphia. Its advice: By following the recommendations of the salt supplier, proper rectification can be made quickly and satisfactorily with the assurance that both high and low carbon steels can be hardened without damage to the surface caused by carburization or decarburization.



First the links are formed . . .



then welded into chain . . .

Know Your Chain

By H. E. McCARTHY and H. F. REID
Head of Quality Control *Technical Service*
McKay Co.
Pittsburgh

It will pay you to have a better understanding of the various types of commercial chain. You may be using a more expensive one than conditions warrant, or vice versa

TO the man in the street, a chain is a series of interconnected metal links. Size and shape of the links may vary, but to him, all chain is pretty much alike.

The plant safety engineer and the chain manufacturer, on the other hand, look at chain as a tool designed for specific materials handling problems. Wide variety of chains emphasize the wide variety of end uses.

Alloy or Carbon Steel?—Electric welded and forge welded carbon steel commercial chain constitute the bulk of the so-called "barrel-chain" or "pound-chain" business. Welded carbon steel chain is available in four distinct grades each with specific properties and limitations.

Working properties of these various grades are compared graphically with those of wrought iron and alloy steel chain in Fig. 1. Subsequent paragraphs describe the properties of each of these grades.

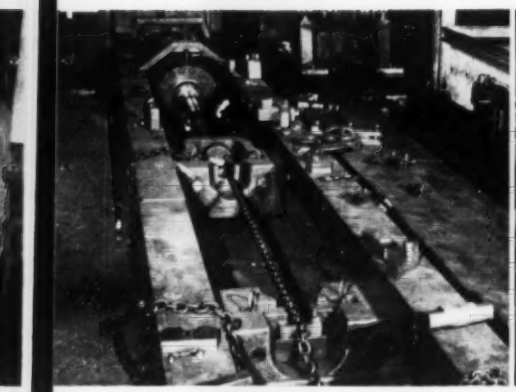
Proof Coil—This is the oldest of the welded carbon steel chain. Though over-all working properties of proof coil chain have been surpassed by other types of welded chain, popularity for general use and for use in light-load-bearing assemblies remains unchanged. Manufactured from C-1007 or C-1010 rod or wire, chain and attachment links are electric or forge welded, the latter used for large diameter links.

After welding, proof coil chain and assemblies are proof tested at twice working load limit, reinspected and given surface preparation. This chain is most economical where capacity of lift cannot be determined. Low initial investment and ease of field or shop repair make it desirable for general utility.

BBB Chain—Excellence of proof coil chain was first challenged by BB and then by BBB chain, difference being in link size and working loads. In recent years, the intermediate BB chain production has been discontinued.

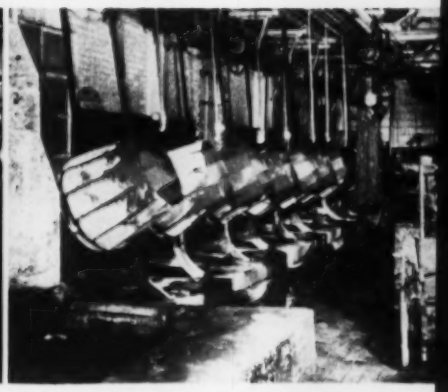
BBB chain, like proof coil, is produced from C-1007 and C-1010 mild steel. Link dimensions are the only essential difference in design and production of these two types. BBB links are shorter and more compact, producing chain with more links per foot and about 25 per cent greater working load limit than proof coil.

Steel Loading Chain—This is the third basic type of chain produced from mild steel wire or rod. In design it is more compact than either proof coil or BBB and has greater work load limits and ductility. In ductility, this chain most nearly resembles the elongation properties



which gets a proof testing . . .

Carburizing is for wear resistance . . .



then there's a final polishing

of wrought iron chain. Relieved of drawing stresses, this chain will pull stiff and become inoperative before reaching the break point. This load is generally about three times the working load limit.

This chain, too, is often chosen for use where loads of undetermined capacity are being encountered. As in the case of the other mild steel chains, steel loading chain may be easily repaired.

Hi-Test Chain — This is the strongest, most compact chain produced from unalloyed, carbon steel base material. Produced from either C-1017 or C-1020 material, it responds to heat treatment to produce a product with work load approximately three times that of similar proof coil chain and more than twice that of BBB chain.

As an intermediate grade between non-heat treated, non-alloy chain and alloy chain, Hi-Test offers an economical means of lifting loads of rated capacity. High working load limits allow reductions in the size of chain employed for specific applications. This cannot be repaired in the field or shop.

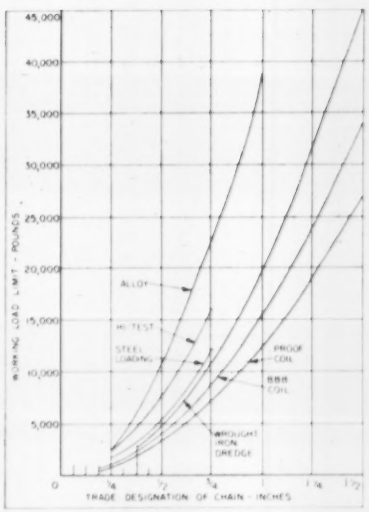
Wrought Iron Chain — Modern wrought iron is a carefully controlled product designed to provide the optimum combination of tensile strength, abrasion resistance and ductility. Wrought iron chain has inherent advantages in that under rough abrasive usage the surface will work harden rapidly, thus improving wear resistance and service life. High ductility of the chain provides a visual means of detecting overloading.

Work hardening actually contributes to wrought iron chain's chief disadvantage—embrittlement. Excessively work hardened chain is crack sensitive and may fail at loads considerably below the working load limit. Many chain users however, have developed annealing practices consistent with their requirements and equipment. This practice can restore the wrought iron's original ductility.

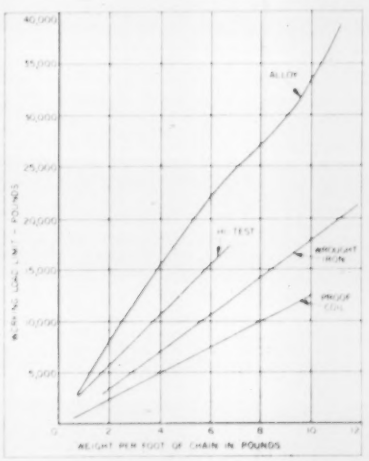
Alloy Chain — Chain manufactured from nickel alloy steels is the newest and strongest commercial product available. Selection of proper nickel alloy steel is restricted to those on which strong welds can be produced on an economical mass production basis. AISI 4615 nickel bearing steel best meets all requirements, but TS 8620 steel has proved a satisfactory alternate in these days of nickel shortages.

Alloy chain, attachments and assemblies are heat treated to develop an average hardness of 26 Rockwell C, average tensile strength of 125,000 psi and a minimum elongation of 15 per cent in 10 inches. This type of chain is the most economical method of handling loads at rated capacity. High work load limit reflects itself in lighter, smaller chain assemblies; smaller bulk reduces shipment costs, storage space and dead weight in any rated lifting job.

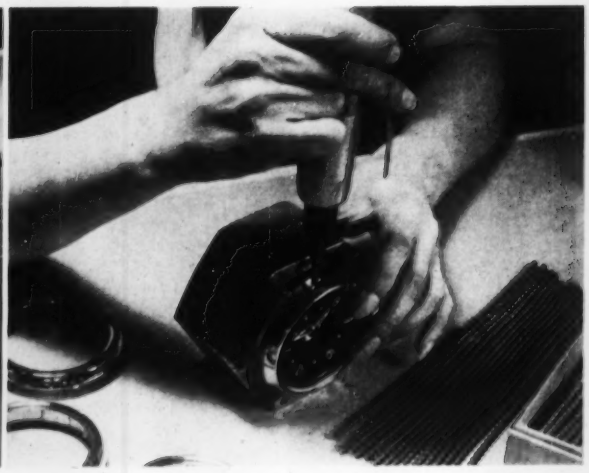
This type of chain is not recommended for use on loads of undetermined weight. Higher initial cost of alloy chain, as compared to other types of chain of same size (but not same rated capacity) necessitates that the chain shall be used within prescribed limits.



This graph shows how the six types of chain discussed stack up against each other on work load vs link sizes



Comparison of weight per foot of chain shows superiority of alloy chain over others. Economics may favor other type



With clock case, movement, face and retaining rings held in assembly fixture, parts are fastened as fast as operator can move the power driver

Tool is loaded by inserting stick and pushing through until chuck engages on head of second screw. It takes some 50 screws to make a stick

Timemaker Finds A Timesaver

Small screws in stick form feed automatically to reduce assembly stations from four to one on automatic clock line. They've cut personnel training time, too

"AS EASY as pointing your finger" is how the driving operation of Screwstick has been described by its present users. Nowhere has this been more clearly demonstrated than at Lux Clock Mfg. Co., Waterbury, Conn., who use screws in stick form in the assembly of an instrument panel clock for an automobile manufacturer.

In the old methods of assembly, parts of the clock were held in place by very small screws made on automatic screw machines and individually placed by hand in the various locations. Production of the screws by this method was costly and many were dropped and lost. Assembly was slow, required skilled operators and several assembly stations had to be set up.

Not Now—With the introduction of Screwstick, assembly was placed on a conveyor-type belt. At the first station, the movement is placed in the clock case and fitted with a retaining ring. As this unit moves down the line, the clock face, sub-bezel and bezel are each put in place in this sequence by individual operators.

At the last station the air-powered Screwstick driver automatically feeds each screw into position. Three screws are driven through the bezel into the clock case, fastening the entire unit and making it ready for inspection.

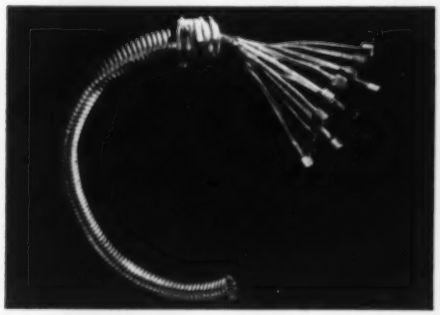
Lots of Savings—In the final analysis, it was determined that the training period for personnel was reduced by 75 per cent due to the ease of driving these screws in stick form. The number of people involved in assembly was limited to one for every four formerly needed with a like saving in assembly line space. Clock production increased 3½ times.

Producer of Screwsticks is American Screw Co., Willimantic, Conn. They are made in machine, thread forming and tapping screws in diameters ranging from #0 to #6 and in lengths up to 5/16 inch. Screwstick is currently being manufactured from steel and various alloy metals including brass, aluminum, stainless steel and nickel silver.

For the new pneumatic instrumentation

Cabled Tube

The recent tremendous increase in the use of tube instead of wires for instrumentation and control purposes has led to an important new development—cabled tube. This is an armored group of long tubes twisted together to permit bending without distortion. An insulating tape is wrapped over the bundle of tubes to prevent electrolytic action. Then interlocking, flexible galvanized steel armor is applied, like BX. This protects the tubes from injury during shipment, storage, installation, and in service. Standard fittings, boxes and cabinets can be used for junction boxes and terminations. To make it possible to readily identify each tube, one tube in each layer is colored; the position of each tube in each layer in relation to the coded tube

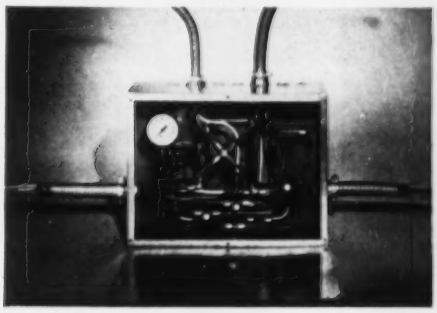


remains the same throughout the length of the cable.

The tubes usually are copper, but aluminum tubes can be used for special purposes. For unusually corrosive situations, a plastic outer sheath can be applied. As many as 19 tubes, ¼" OD, can be cabled, and supplied in lengths up to 1,000 ft.

Showing the construction of Crescent Armored Multitube, made by Crescent Insulated Wire and Cable Co., Trenton 5, N. J., which will supply further information on request.

Since the tubes carry not electricity but air, nitrogen, helium, or a fluid, they are especially attractive in potentially explosive locations, as in refineries and chemical plants. Utilities are also turning decisively to this new cable, while automatic process control (automation) is a rising application.



Revere, as a supplier of tube for this purpose, calls this cabled tube development to your attention as a matter of general and perhaps specific interest. See Revere for copper, aluminum and brass tube and pipe, electric welded steel tube, and lockseam tube. Call the nearest Sales Office.

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This photo was taken after initial furnace filling. No hand leveling had been done. Even stock distributions was obtained continuously

Top photo shows distribution of coke in stationary hopper. Note left side about 30 inches higher than right. Bottom photo shows level coke distribution obtained in spinning hopper

Better Distribution With High Speed Tops

Interlake's furnaces are up in efficiency since adapting small bell hoppers for fast rotation during filling. Stock line is even; there's less separation of fines

"TURN that 35-ton revolving hopper at better than 20 rpm? You must be crazy!"

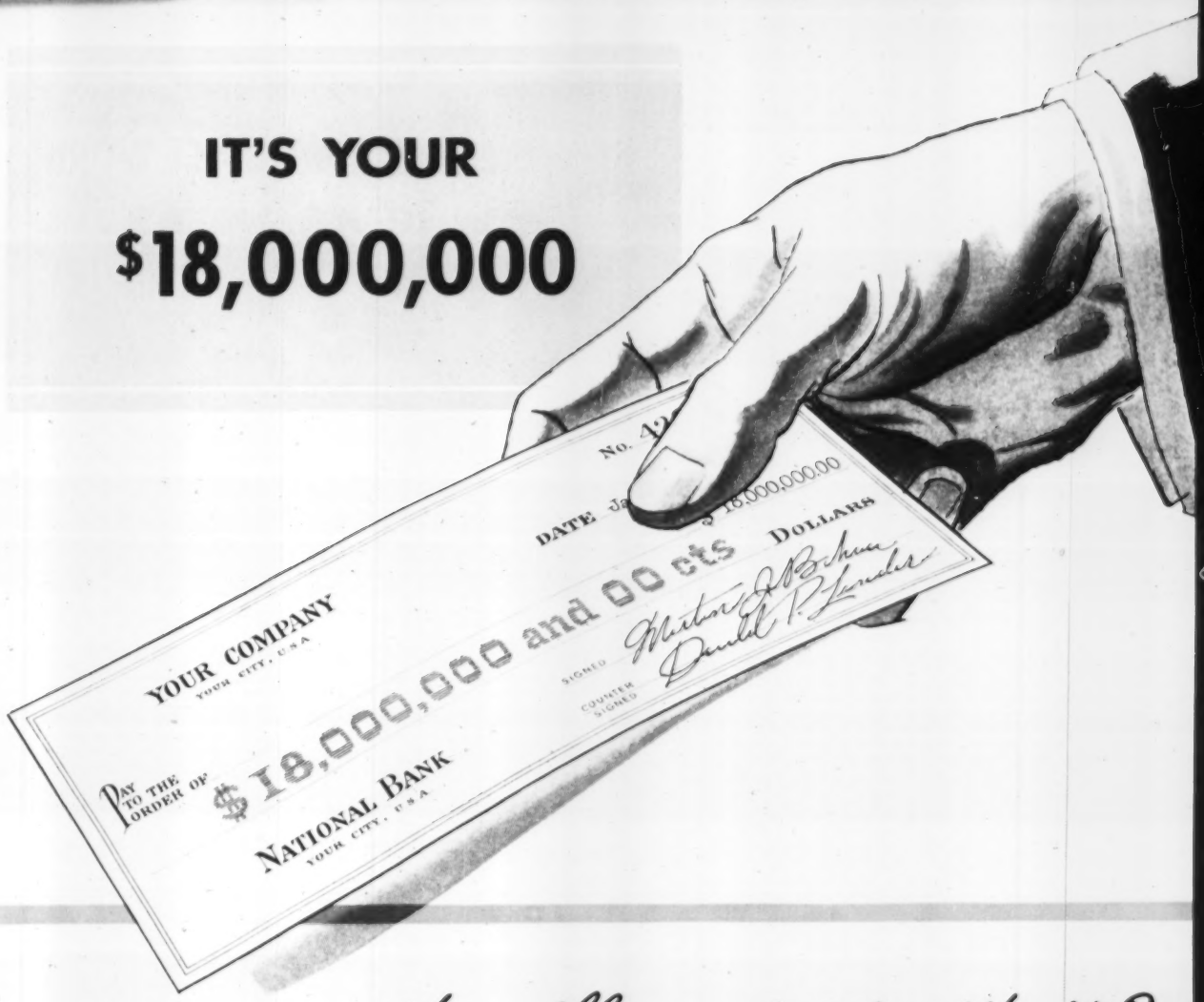
That was a pretty typical reaction from blast furnace men whenever H. W. Campbell and C. P. Johnson, Interlake Iron Corp. chief engineer and Chicago district general superintendent respectively, talked about their idea for improving raw materials distribution at the top of the furnace. Most of the doubters didn't know at the time that Interlake was already using the idea on its "A" furnace in Toledo.

Right from the start, distribution was excellent. Test rodding of the initial furnace filling showed level stock in every quadrant and after each series of rounds. Usual blow-in procedure of sending men in to hand level the stock in final stages of filling was completely unnecessary. Five out of the six Interlake furnaces now use the high-speed tops and it will be installed on the sixth furnace soon.

Bit of History—Revolving tops are nothing new to the blast furnace. Distribution has long been recognized as the key to more efficient operation. In the early 1900's the 6-point revolving distributor came on the scene and offered improvements in distribution, but as more and more furnaces became double-skip charged, receiving hoppers had to be designed to accommodate the off-center skip dumping. Their design set up swirling motions in the materials which in turn created high and low spots in the pile on the small bell.

The Idea — Why not, reasoned Messrs. Campbell and Johnson, have the small bell hopper revolve at a pretty good speed all during the skip dumping? By having the top spin fast enough to make at least one revolution in the time it takes to clear a skip load of material, piling should be level on the small bell, thus level when it is dropped onto the big bell. It wasn't long before they reasoned that by alternating the direction of rotation

IT'S YOUR
$18,000,000



... who will you trust with it?

WHEN your company invests that kind of money in new plant construction you will have to have confidence—a lot of confidence—in the people you trust with the job.

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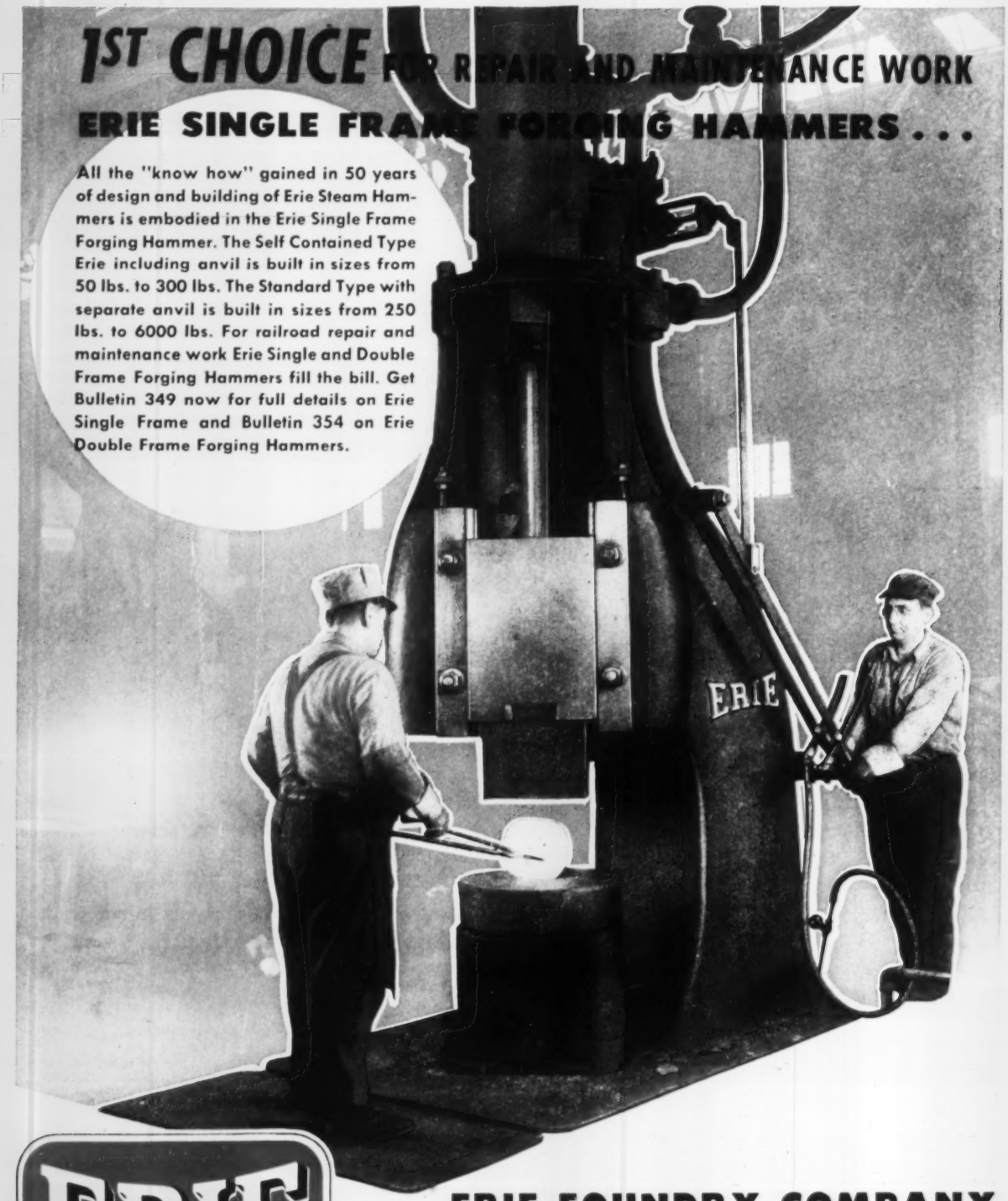

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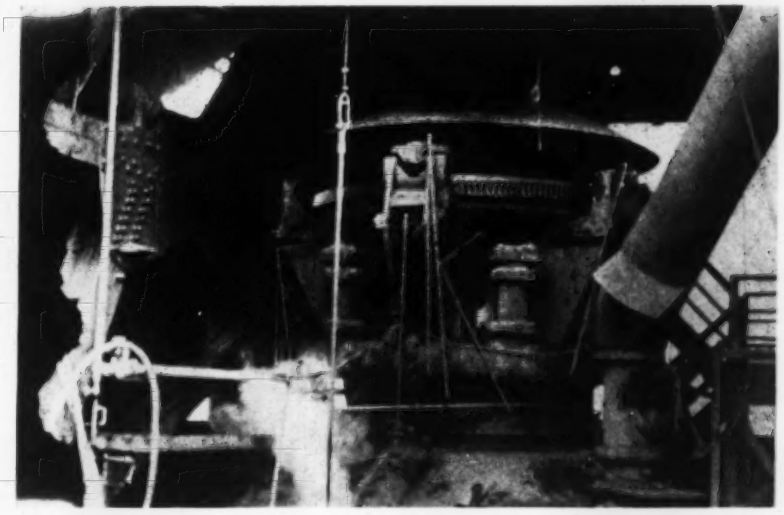

Spinning top, equipped with a water seal, looks no different from a 6-point top. The driving motor is slightly larger; speed reducer has a lower ratio

to always oppose the direction of stock swirl they could effectively increase the relative speed of hopper rotation. Thus the troublesome swirling action is put to good use.

The 6-point tops rotate through their 60-degree increments at about 2 rpm, so the planned jump to over 20 rpm left many questions open to speculation. Interlake officials insisted the idea looked good enough to try, and the Toledo "A" furnace which was due for relining during the winter of 1950-51 was chosen for the trial.

Not Many Changes — Since the principal change from the conventional top is the rapid spinning of the small bell hopper the same general mechanical design is used. Motor size has been stepped up to 35 hp and a lower ratio speed reducer is required.

Control is very simple, as it eliminates the 6-point feature. Hopper starts spinning at the time the skip car goes into the slowdown at the top of the furnace, and by the time skip reaches dumping position, hopper has accelerated to full speed. It is a simple matter to reverse hopper rotation for each skip, and, as a matter of fact, the reversal is desirable because it produces more even wear on gears and pinions.

Success — No time was lost in filing applications for patents and in ordering a second spinning top for Toledo "B" furnace which was next on the relining program. Both furnaces were arranged so that if any trouble did develop, they could quickly go back on 6-point operation.

When it came time for ordering a top for the new Erie stack, the 6-point top was left completely out of the consideration. It and two other Interlake furnaces have all been equipped solely for high-speed top operation. Interlake is now making these tops available to industry through license agreements.

Operating Results — Improvements in operation with the high-speed top are best shown at Toledo "A" and "B" where they have been in operation long enough to prove their worth. The enclosed chart tells the production story in terms of output, coke rate and flue dust rate. The latest blast on both furnaces has been with the high-speed top in operation.

As flue dust production decreased, filter cake and dust available for Interlake's 800-ton Toledo sinter plant decreased. This not only allowed more fine ore to be used in the mix, but also improved the quality of the sinter, increasing amount of oversize ore, which greatly improved the furnace burden. This resulted in still lower flue dust production and permitted blowing more wind.

Indicative of the vastly improved flue dust situation is the fact that during the first seven months that both furnaces had the new high-speed tops, Toledo used up a 50,000-ton pile of flue dust that had accumulated from previous campaigns. Since that time, Interlake has been shipping flue dust from other plants for use at the Toledo plant.

	First 18 Month Average Toledo A Furnace			First 18 Month Average Toledo B Furnace		
	Blast 16	Blast 15	Blast 14	Blast 15	Blast 14	Blast 13
Pig Iron Production, Total Net Tons	439,564	332,415	380,102	490,626	413,591	403,125
Pig Iron Production, Per Day	799	609	695	895	753	788
Coke Consumption, Total Net Tons	372,062	293,456	339,091	405,649	356,541	336,133
Coke Consumption, Per Net Ton Pig Iron (Pounds)	1,693	1,766	1,784	1,654	1,724	1,668
Wind Blown, Cubic Feet Per Minute	51,589	41,891	47,100	57,247	48,462	47,966
Blast Temperature, Degrees Fahrenheit	1,083	1,060	1,124	1,024	1,028	869
Dust Catcher Dust (Dry), Pounds Per Net Ton Iron	55	376	245	93	310	316
Gas Washer Dust (Dry), Pounds Per Net Ton Iron	51	182	131	63	101	155
Total Dust (Dry), Pounds Per Net Ton Iron	106	558	376	156	411	471
Slag Volume, Pounds Per Net Ton Iron	897	905	909	879	909	855
Mesabi Ore Charged Direct, % of Total Ore & Sinter Charged	13	20	24	11	21	25
Old Range & Mesabi Oversize, % of Total Ore & Sinter Charged	58	53	46	60	51	58
Sinter Charged, % of Total Ore & Sinter Charged	29	27	30	29	28	17
Borings & Turnings, % of Total Ore & Sinter Charged	4.1	1.6	1.3	4.8	1.2	5.8
% Fe in Total Ores	49.66	49.17	49.29	49.29	49.59	48.07
% Fe in Sinter	54.98	55.25	56.15	54.45	52.42	56.13
% Fe in Total Ore & Sinter Charged	51.22	50.85	51.32	50.75	50.41	49.50
% Fe in Borings & Turnings Charged	91.19	88.54	85.14	90.73	83.80	84.01
% Fe in Total Metallic Charge	52.80	51.45	51.77	52.59	50.81	51.37
Average % Silicon in Iron Produced	2.20	2.31	2.54	2.13	1.99	2.18
Per Cent Fixed Carbon in Coke	91.01	91.41	89.55	91.08	89.37	92.95
Per Cent Sulphur in Coke	.59	.58	.62	.58	.62	.60
Furnace Down Time, Total Days	2.57	3.42	3.53	2.51	1.77	3.24
Furnace Operating Time, % of Total Time	99.53	99.37	99.35	99.54	99.68	99.41

Table gives some vital statistics. Latest blasts are with high speed tops

From a paper prepared by Messrs. Campbell and Johnson for the Blast Furnace and Coke Association meeting in Cleveland last fall.

Where corrosion...temperature...pressure cause other valves to fail . . .

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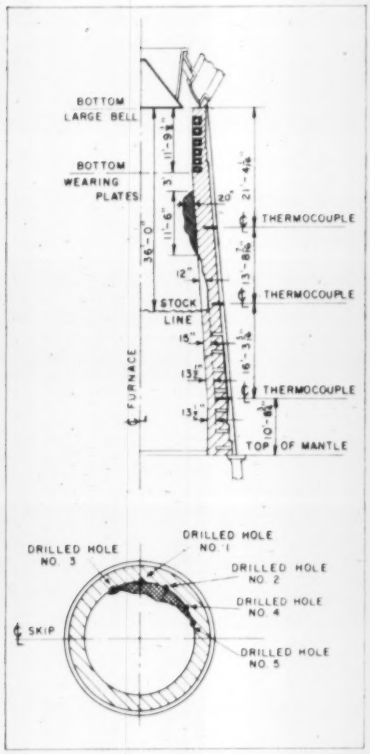


Section through 15-ton furnace scab which was dislodged by dynamiting

Downs Furnace Scab In Three Shots

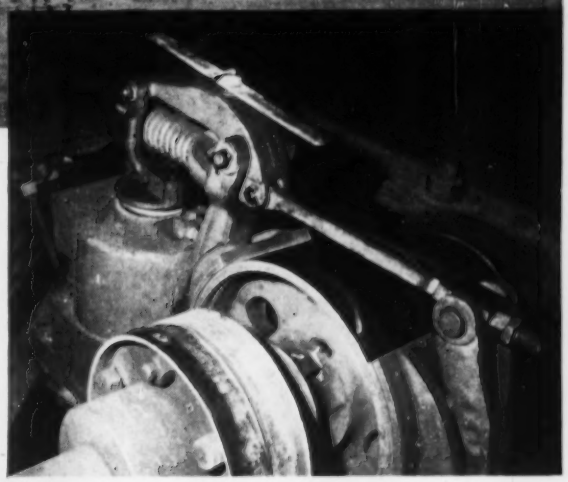
Thermocouples located the outline of the "frozen" stock, and dynamite released it

REMOVAL of a scab from the lining of D-6 stack at Central Furnaces and Docks, United States Steel Corp., Cleveland, was accomplished recently by the use of dynamite. The position of the scab on the inwall was located by taking surface temperature readings on the exterior of the shell in the vicinity of the affected area. The readings dislosed the scab as extending from 14 feet 9½ inches to 26 feet 3½ inches below the stockline, a height of 11½ feet; the thickness of the scab later was found to be 2 feet.

Scab Dislodged — The stockline was placed 36 feet below the bottom of the large bell according to a predetermined charging and blowing schedule. Meanwhile, five holes were drilled at different lo-

ELECTRICAL CONDUIT

DULUTH-SUPERIOR BRIDGE opens from 15 to 50 times daily in the iron ore shipping season to let ore boats through. Wiring for lighting, protected by 1500 feet of Everdur Electrical Conduit, is installed under the deck.



HERE EVERDUR CONDUIT protects wiring to electric brakes on bridge motor. It is also used for power lines to emergency generator, and on lines serving strip heaters in power house.

Everdur passes long test on Duluth-Superior span

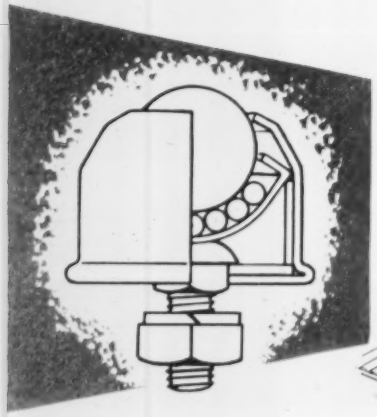
One job Everdur* Electrical Conduit does on the Duluth-Superior Bridge is protect electric light lines. Heavy rain and snow driven by 60 to 70 mile-an-hour winds often pound at this conduit. Heat and cold do their worst. It is exposed to acid fumes from ore boats and rail traffic. Vibration from opening and closing of the bridge, and constant traffic, is a daily threat. Yet recent inspection shows the Everdur Rigid Conduit still in excellent condition. Not a sign of wear, rust or corrosion!

Everdur Electrical Conduit is made of Everdur Copper-Silicon Alloy in two wall thicknesses (R.C. and E.M.T.). For additional information about this Anaconda Product, write to: *The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.*

*Reg. U. S. Pat. Off. 53156

***wherever corrosion resistance counts*—EVERDUR ELECTRICAL CONDUIT**

an ANACONDA® product



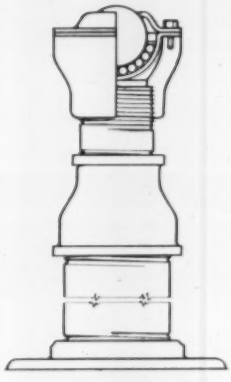
Logan Ball Transfer units consist of a large steel ball which rotates on a bed of small balls contained in a hardened steel cup.

BALL TRANSFERS

Logan Ball Transfers are handling equipment, designed primarily for use in transferring at right angles or where it is desired to rotate packages without lifting. Can be adapted to other applications. You can buy separate ball assemblies from stock or complete tables made-to-order.

Logan offers Ball Transfer units in several different sizes.

Further information on request.



Ball Pedestal units also available for handling sheets and plates.

Logan Conveyors

LOGAN CO., 535 CABEL ST., LOUISVILLE, KY.

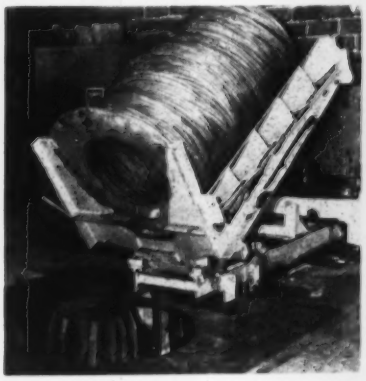
cations in the inwall lining behind the scab and these were filled with dynamite. The 15-ton build-up was dislodged with three shots.

Downtime of the furnace was 8 hours and 22 minutes which was equivalent to 515 net tens of production. When normal blowing was resumed, the stack immediately responded to a higher output.

Coil Handling Made Easy

LOADING and unloading rod and wire coils on annealing staves in a single operation is now accomplished with a hydraulic machine, a development of Lee Wilson Engineering Co. Inc., Cleveland.

Operation of the device is simple. A rod hook with its batch of coils in a horizontal position is



Rods are machine tilted to near vertical position over spider in pit

lowered into a trough of the loading machine and the hook withdrawn. The trough then is tilted by hydraulic equipment until it is near vertical. When the load is brought to rest the coils are positioned over a pit containing an empty spider.

The operator threads an automatic safety tong through the batch of coils and hooks on to the top of the spider. The crane then lifts the spider until its base plate engages with the bottom coil and the stack of rods is hoisted from the machine and transferred to the annealing station. Unloading a spider is accomplished by reversing the various steps in the operation.

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Supplying these "muscles of steel" to the giant that is American industry is our big job here at Wickwire—a job we've been doing well for over half a century.

In the mines . . . the quarries . . . the logging camps—and wherever wire rope is used, they'll tell you that for utmost safety, longer life and most economical service you can always count on the quality and strength that is built into Wickwire Rope.

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But, in addition, highest quality plating supplies must be used with good equipment for best results. That's why Udylite plating supplies are so important to you. High quality . . . rigid control . . . is your assurance that Udylite plating supplies plus Udylite equipment give the finest results in the plating industry.

There is no better way of plating than the Udylite way. Put it to work for you. Let the Udylite Technical Man give you all the facts.

PIONEER OF A BETTER WAY IN PLATING

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

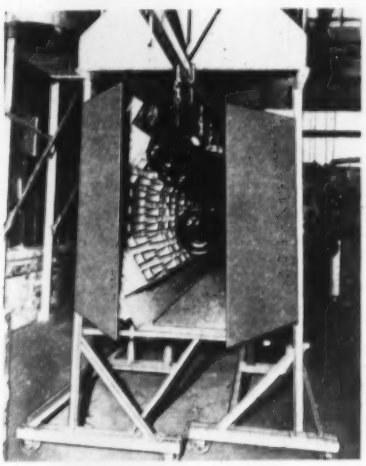
Electric Radiant Panels

Flexible oven handles paint baking of automobile accessories of various sizes

NEWEST thing on wheels is the wire spoke hub cap. And equally new is the method used to heat-cure special enamels on these and other automobile accessories. Approximately 200 hub caps an hour are finished by the method, which uses far-infrared electric heat.

A. S. Campbell Co. Inc., East Boston, Mass., was trying to obtain quick but thorough curing of Alkyd-urea-phenol-formaldehyde-melamine enamel on the wheel discs.

At the same time, they wanted a baking oven that would also be flexible enough to handle paint baking of other parts of various sizes including grill and bumper guards, license plate frames and bumperettes. The installation of 24 Chromalox electric radiant panels



HEATED HUB CAPS
. . . other auto parts also handled

met all the requirements. Since the nodular panels are standard and have built-in electrical connections, the oven was assembled and put into operation almost immediately.

The panels, rated at 10.8 kilowatts each, were easily bolted to simple steel framing to form two oven halves. These sections are mounted on casters so that the oven can be adjusted for different sized parts and for heating requirements.

Each of the panels is four feet long, giving a 16-foot oven with four heat zones.

Exact Heat Measured — Heat is measured out exactly for each part by means of four input controllers and eight magnetic contractors. Each of the contractors energizes a group of three panels and the input controllers modulate the output of several panels for 0 per cent to 100 per cent of capacity for close vernier control. For fast curing finishes or for very light work any section of the oven can be turned off entirely. A continuous conveyor takes parts from paint booths through the radiant oven, and on to the take-off point. Conveyor speeds can be varied from 2 to 8 fpm. Average time in the oven is only four minutes for the wheel covers, while curing time for other parts is between 1½ and 8 minutes.

The temperature of parts leaving the oven is about 400° F. To allow time for cooling, and to save floor space, the parts are raised to the ceiling and carried overhead to the unloading point.

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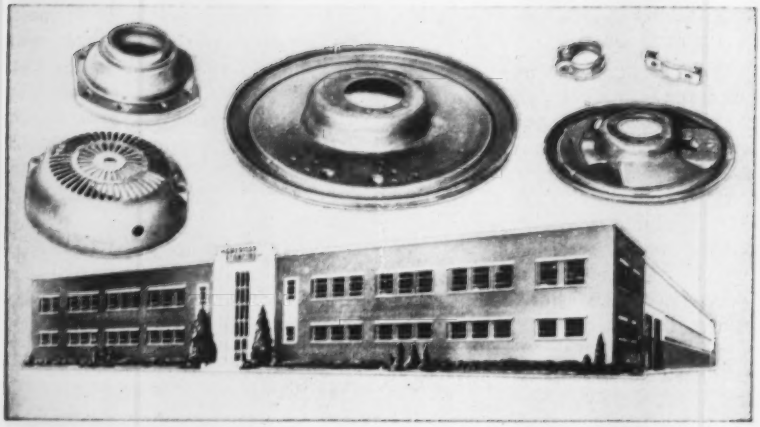

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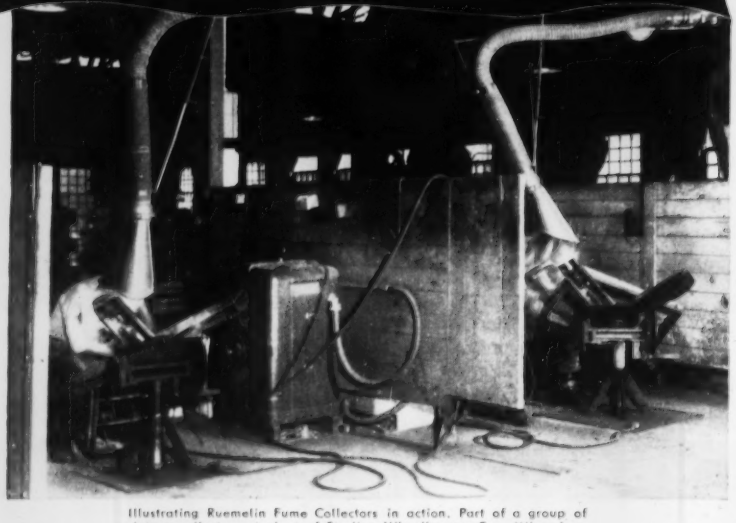
RUEMELIN *Welding Fume Collectors*



Illustrating Ruemelin Fume Collectors in action. Part of a group of sixteen collectors at plant of Sterling Wheelbarrow Co., Milwaukee.

Collects fumes at the source! Counterbalanced inlet hood stays in working area automatically. Hoods have great lateral and vertical range for table, positioner or floor use. Thousands in every day service. Write for bulletin 37-E.

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A 7698-1/3

Less Aisle, More Space

One third narrower aisles solve storage problem. Transveyor handles stock

Obtaining the most efficient storage use of its 21,000 square feet was a big problem facing Lamson & Sessions Co., Cleveland. A one-story manufacturing plant, 70 x 300 feet, with a ceiling height of 18 feet and a concrete floor, was recently converted to storage and warehouse facilities. It was done by aisles nearly one-third narrower than had been considered possible.

According to Roy Stevenson, chief maintenance engineer, first plans called for 9-foot aisles, considered the narrowest possible for effective materials handling of

AISLES ARE NARROWER
. . . but movement's unaffected

palletized goods. By use of a Transveyor stacker electric fork lift truck manufactured by Automatic Transportation Co., Chicago, 6½-foot aisles were possible.

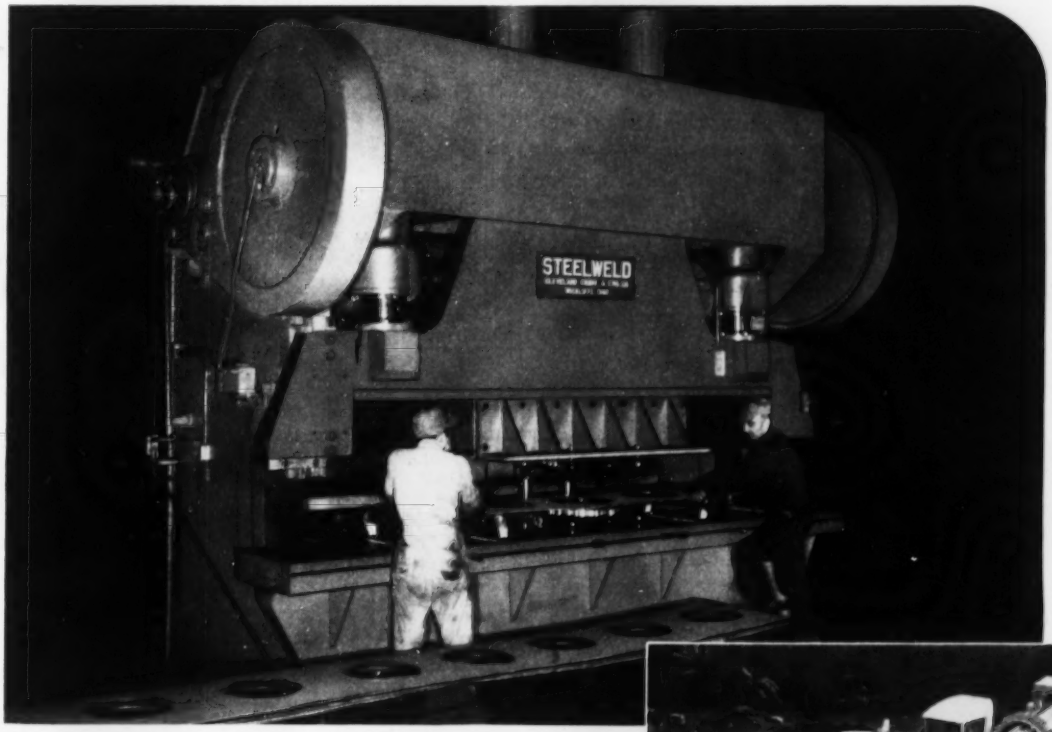
Six aisles of the reduced size were laid out, running off at right angles to a main aisle eight feet wide, facilitating order filling and using available space to its best advantage. Pallet loads of items stored in the warehouse are placed in tiers on both sides of the aisles.

Wooden, reversible, double-face pallets, measuring 42 x 36 in. are used. Cartons, wooden cases or kegs are stacked on them. The Automatic Transveyor performs all stock handling and stacking tasks.

Punches 15" Holes For Warner & Swasey Gradalls

Also Performs Bending and Flanging Operations

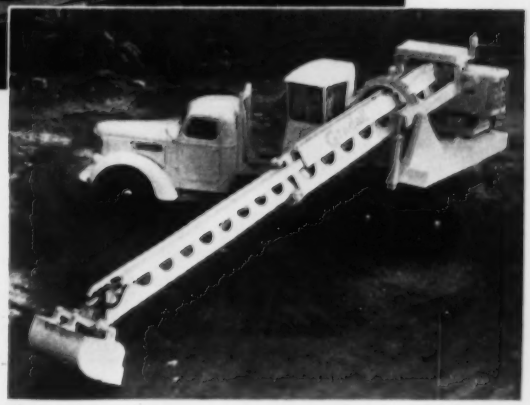
Flanging 15" diameter holes in outer boom plates of 3/16" steel. The holes were punched previously on this press.



Practically all of the steel plate on Warner & Swasey Gradalls, manufactured at their New Philadelphia, Ohio plant, is formed, punched and flanged on a Steelweld Press which is designed to brake steel plate up to 16' x ½".

One of the more interesting jobs done on this machine is the punching of 15" diameter holes in Gradall boom plates, followed by a flanging operation. Through use of special movable punches, many smaller holes of various sizes are made at a time, in locations as desired.

The versatility of Steelweld Presses to handle efficiently many varied operations has proven of tremendous advantage to many users. You, too, may find the many features of these machines of great help. A representative will be glad to give you the details.



Gradall ready for action. Has ½ yd. bucket and 24 ft. telescoping boom that lifts, tilts, and turns 360° around truck.

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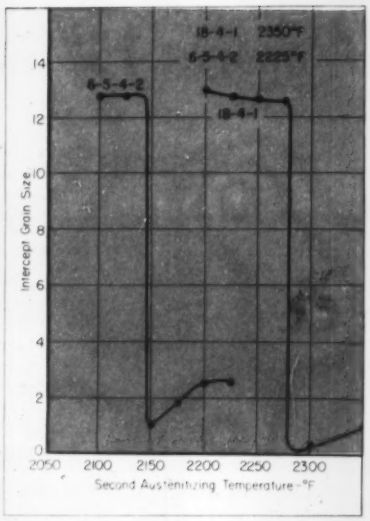
Fig. 1—Grain size vs. second austenitizing temperature for the 18-4-1 and 6-5-4-2 high speed steels. The 18-4-1 was prequenched from 2350° F and the 6-5-4-2 from 2225° F. Sizes don't change below coarsening temperature



Take Guesswork Out

OF GRAIN SIZE DETERMINATIONS

New technique makes high speed tool steel grain boundaries as clear as original hardened structure before tempering. Procedure is simple and accurate

By RICHARD F. HARVEY
Chief Metallurgist
Brown & Sharpe Mfg. Co.
Providence, R. I.

MAKING the all-important grain size determinations in hardened and tempered high speed tool steels is at best difficult. Such determinations made in the finer austenitic grain sizes are often little more than educated guesses. But with a new technique which combines special heat treatment and simple etching, structure in the entire range of grain sizes is clearly revealed.

Method consists in rehardening below the grain coarsening temperature on the second austenitizing treatment followed by Nital etching. Fundamentals on which this procedure is based were developed and reported by Grobe, Roberts and Chambers[1] and by Kula and Cohen[2]. To provide suitable background for understanding the principles of the new procedure, a brief review of some of the established principles is in order.

Temperature vs. Grain Size—On rehardening high speed steels the original austenitic grain size remains essentially unchanged with increasing temperature up to the coarsening temperature where an abrupt change in grain size occurs. This is shown in Fig. 1 in which the intercept grain size is plotted against the second austenitizing temperature for 6-5-4-2 (M-2 type) and 18-4-1 (T-1 type) high speed steel originally austenitized at 2225° F and 2350° F respectively.

It will be noted that the coarsening temperature on rehardening is about 75° F below the first hardening temperature. Very coarse grains formed above the coarsening temperature on rehardening also result in a very coarse "fish-scale" fracture. Another important characteristic is that the fine grains of rehardened steel etch darker than the coarsened grains. Also the uncoarsened grains of rehardened steels etch darker than the same sized, original grains in single-hardened high speed steel.

Putting Them to Work—Application of this new procedure clearly reveals grain boundaries. Even those in fine-grained, tempered steels can be resolved as clearly as existed in the original hardening before tempering. All that is required is that the hardened and tempered high speed steel be rehardened below its coarsening temperature.

A simple Nital etch consisting of 4 or 5 per cent nitric acid in alcohol will clearly reveal the austenitic grain size which is the same as that which existed in its prior hardened condition.

Best Temperature—To reveal the austenitic grain size in hardened and tempered high speed steel, it has been found that the optimum rehardening temperature for best outlining the grain boundaries should be about 25° F below the coarsening temperature on rehardening. Coarsening temperature, however, appears to be slightly higher than is found without the intermediate tempering. It is advisable not to reharden at temperatures below about 100° F lower than the coarsening temperature as the grain boundaries are not sharply outlined.

Even when rehardening temperature is high enough to result in some coarsening, determination of the original grain size can still be made. This is done by determining grain size of that portion of the structure which consists of the re-

References

1. A. H. Grobe, G. A. Roberts and D. S. Chambers, "Discontinuous Grain Growth in High Speed Steel," ASM preprint No. 34, 1953.
2. E. Kula and M. Cohen, "Grain Growth in High Speed Steel," ASM preprint No. 33, 1953.

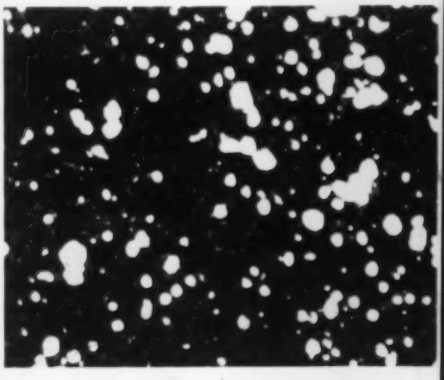


Fig. 4—Same 1.5-8-4-1 sample hardened 2140°F in salt, 10 minutes. Magnification x 1000. The darkened matrix obscures completely all of the grain boundaries after the hardening and tempering operations take place

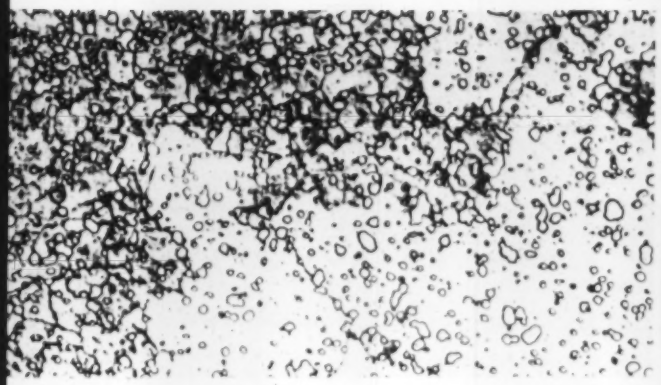


Fig. 2—Mixed coarse and fine grained structure in 1.5-8-4-1 (M-1 type) steel. Prequenched from 2190°F, triple tempered 1025°F, 2 hours; requenched from 2150°F followed by Nital etch. Sample Magnification, x 500

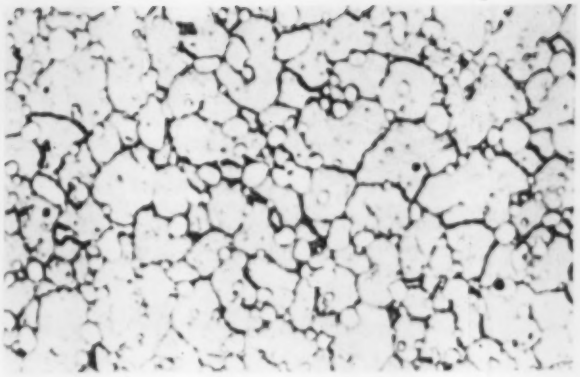


Fig. 3—A 1.5-8-4-1 (M-1 type) hardened 2140°F in salt, 10 minutes. Not tempered. Grain size 19.0, Nital etch. Magnification, x 1000. In hardened condition before tempering, Nital etch readily reveals structure

latively smaller, darker etching grains. These are readily distinguishable from the larger, lighter etching grains formed in the coarsening range. As illustrated in Fig. 2, uncoarsened grains etch darker and are quite small as compared with the light etching, very coarse grains.

The Samples—Figures 3, 4, 5 and 6 reveal the austenitic grains in hardened and tempered high speed steel of the 1.5-8-4-1 (M-1 type) high speed steel. All grain counts are by the standard intercept method of counting the number of grains that intercept a straight line 0.005 inch long.

Sample illustrated represents an underheated fine grain structure in which grain size could not be accurately determined in the hardened and tempered condition by conventional means. Specimens illustrated were 9/16 inch in diameter and ½ inch long.

Comparisons — Note in Fig. 3 that on hardening without tempering the austenitic grains are clearly outlined. When tempered, Nital etching darkens the matrix as illustrated in Fig. 4 so that the grain boundaries are completely obscured.

Etching hardened and tempered structures with mixed hydrochloric-nitric acids in alcohol followed by back polishing in accordance with standard procedures does not resolve the grain structure clearly in fine grained structures. An accurate grain size determination on such a specimen illustrated in Fig. 5 would not be possible. Using the technique outlined, grain structure is as clear in Fig. 6 as that which existed in the original hardened structure before tempering.

Others Too — The rehardening technique to reveal the grain size in hardened and tempered structures is broadly applicable to other high and medium alloy steels which exhibit abrupt coarsening on rehardening.

It should be realized that in many instances, particularly with coarse grained structures, present methods of etching and back polishing are adequate and should be continued. It is in those instances where fine grained structures in the hardened and tempered condition are encountered and where results better than an estimate are required, that the new procedure should prove helpful.

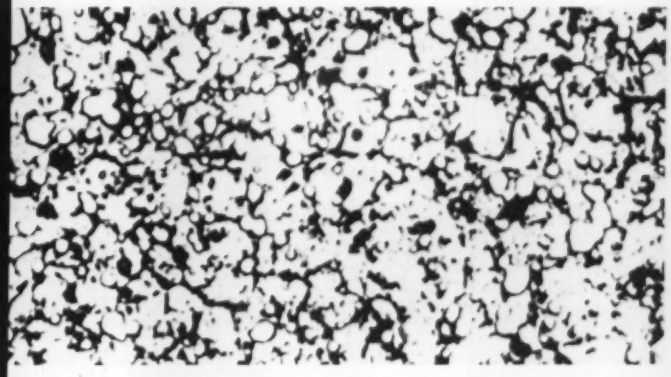


Fig. 5—1.5-8-4-1 hardened 2140°F in salt, 10 minutes. Triple tempered 1025°F, 2 hours. Etched alcoholic solution, 14 per cent HCl and 1 per cent HNO_3. Magnification x 1000. Grain boundaries cannot be resolved

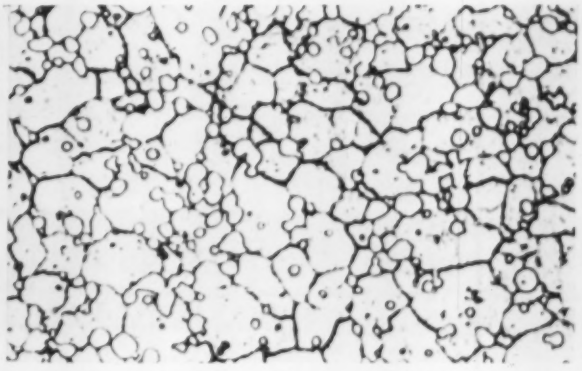
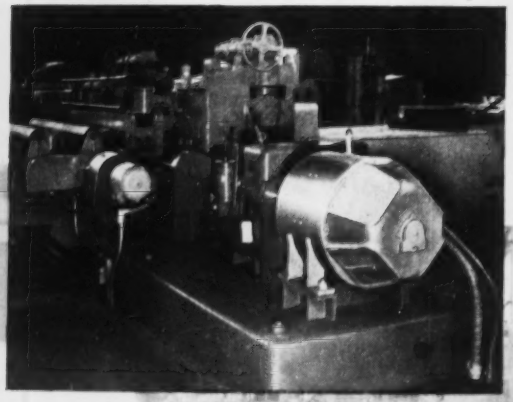
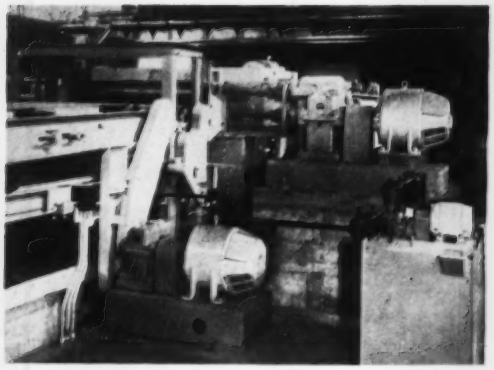


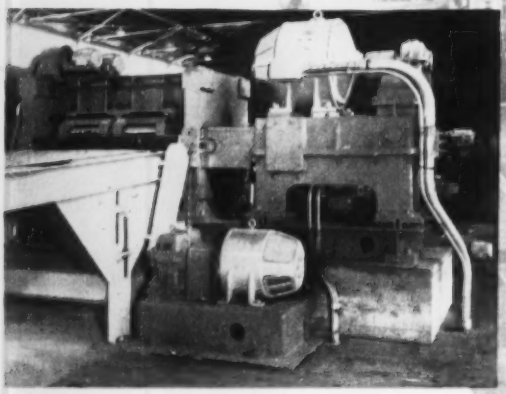
Fig. 6—A 1.5-8-4-1 sample hardened 2140°F in salt, 10 minutes. Triple tempered 1025°F, 2 hours. Rehardened 2125°F in salt, 10 minutes. Nital etch. Grain size 19.2, x 1000. Fine grains can be clearly resolved

The Elliott Crocker-Wheeler 40-hp, 850/1700-rpm d-c motor that drives the side trimmer in the shear line. At the left, an Elliott C-W 2-hp induction motor serving side guide adjustment.

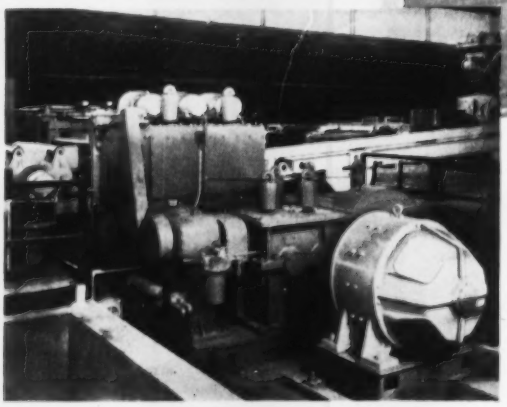




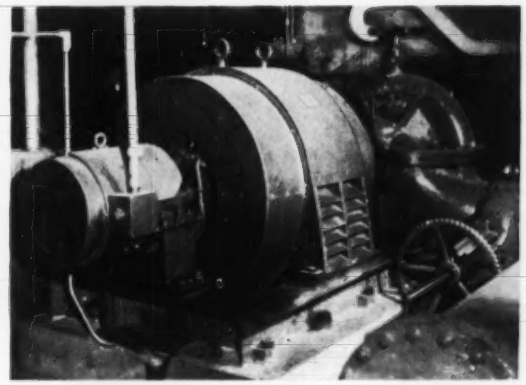
A 20-hp d-c motor, at right, drives the oil machine and pinch roll on the reject piler. Below, main drive for the belt conveyor, also a small a-c motor on an oil pump. All these are Elliott C-W motors.



The leveller in the shear line is driven by the Elliott C-W 100-hp, 850/1500-rpm d-c motor shown at top. At bottom, a 15-hp motor drives the belt conveyor, and at top left, two 2-hp motors drive the roll adjustment.

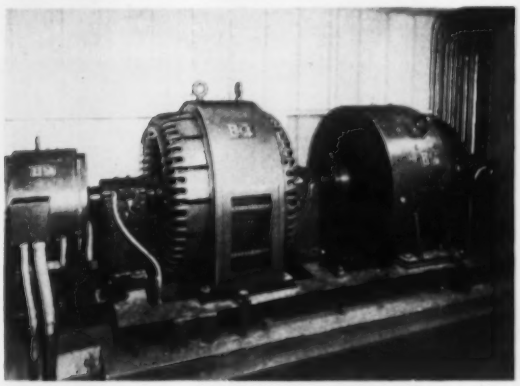


The Hallden shear and its main drive—an Elliott C-W 150-hp, 690/1200-rpm, dripproof, protected d-c motor. Also shown are three 2-hp and one 5-hp squirrel-cage motors on secondary drives.



An Elliott 1500-hp, 900-rpm, .8-pf, 6900-v dripproof synchronous motor with direct-connected exciter. This one drives one of the two large water pumps. Another pump is driven by an Elliott steam turbine.

Power for the shear line is supplied by this Elliott motor-generator, a 450-kw, 1200-rpm d-c generator with 25-kw exciter, driven by a 700-hp synchronous motor.



How ELLIOTT motors serve Pittsburgh Steel's expanded facilities

One of the major expansion projects of Pittsburgh Steel's Program of Progress is the new facilities in the Allenport Works, located 25 miles south of Pittsburgh. Among the important new installations in this mill are the hot shear line and a new water pumping plant. Elliott motors, ranging from 1 hp to 1500 hp, provide a number of main and secondary drives in both of these new additions. As the photos on these two pages indicate, a variety of Elliott motors are serving in this mill, as they are in others throughout the steel industry. Full details on the line are available at any Elliott District Office or from Elliott Company, Jeannette, Pa.

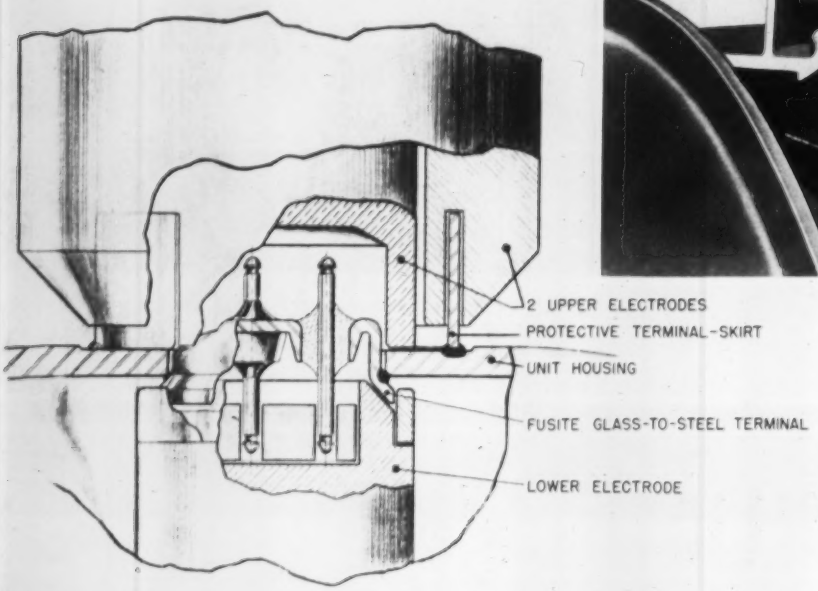
ELLIOTT Company

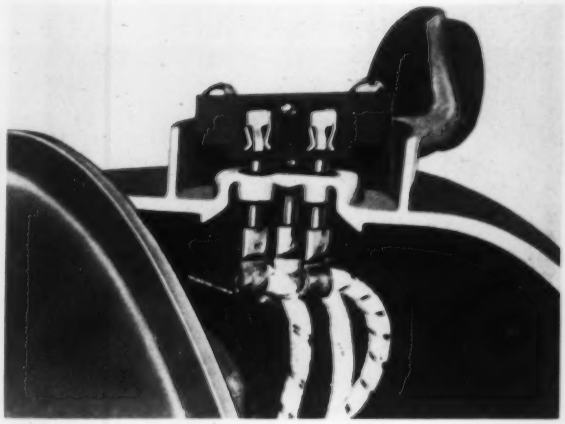
STEAM TURBINES • MOTORS • GENERATORS • DEAERATING HEATERS • EJECTORS • CONDENSERS • CENTRIFUGAL COMPRESSORS • TURBOCHARGERS • TUBE CLEANERS • STRAINERS

RIDGWAY DIVISION • CROCKER-WHEELER DIVISION

Q3-4

Recently developed two-in-one welding operation uses two upper electrodes of the welder at slightly different levels to weld terminal flange to compressor housing and protective skirt around terminal in one operation. Inset shows terminal on compressor housing





By ANDREW WYZENBEEK
Chief Engineer
Fusite Corp.
Cincinnati

Hermetic Terminals

READY FOR BIGGER ROLE

Rugged units prove electrically and mechanically sound on refrigerator compressors. Fast welding technique opens possibilities in other sealed electrical applications

FACED with the problem of hermetically sealing military electronic devices during the war, researchers devised a rugged, high production single and multiple glass-to-steel hermetic terminal. When the terminals became available after the war, the household refrigerator industry saw them as answers to their compressor problems. But would they prove economical?

TYPICAL SPECIFICATIONS FOR GLASS-TO-METAL TERMINALS

ELECTRICAL: 2500 ac volts (RMS) at sea level flash-over peak
10,000 megohms insulation resistance after salt water immersion

PRESSURE: 350 psi air without showing leaks under water
2000 psi hydrostatic in housing assembly
3000 to 4000 pounds hydrostatic in test fixture

HEAT SHOCK: Each terminal must stand 500 degrees heat shock when rapidly heated by an induction heater. This simulates resistance welding shock. After this, they must test to 350 psi air without showing leakage while submerged in water.

That question has been answered in the last eight years. The terminals have swept through the entire industry with savings amounting to as much as fifty cents per compressor, totaled mainly in assembly costs.

Fewer Parts—Where as many as 42 parts were necesary in 1945 for a hermetic seal, the new terminals are assembled by projection welding in one swift operation. Over five million of the terminals are now in use in 1/9, 1/8, 1/6, 1/4 and 1/3-hp compressors at 110 and 220 volts up to 1600 volt-amperes.

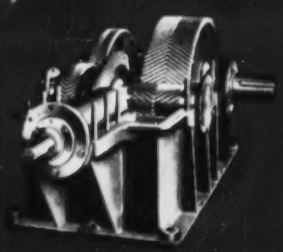
At first it was thought that the terminals were too delicate to withstand the manufacturing process. Some of the first postwar units required water spray cooling while they were resistance welded into the dome of the compressor. Later refinements removed this need for cooling, and the unit is now as tough as the steel that forms the plate.

Fast Work—Prior to glass-to-steel terminals, all connections were based on gaskets with as many as 14 parts per feed-through lead. Assembly labor was high, and epidemics of leaks due to

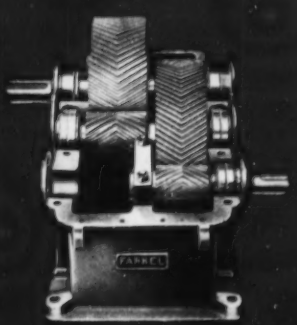
Straight tooth (spur) gears and single helical gears are supplied in any size from ¼ inch to 20 feet diameter, ¼ to 30 inch face, 24 DP to 0.5 DP.

Large internal gears are made with either spur or helical teeth, in sizes up to 18 feet diameter, 12 inch face, 1¼ DP.

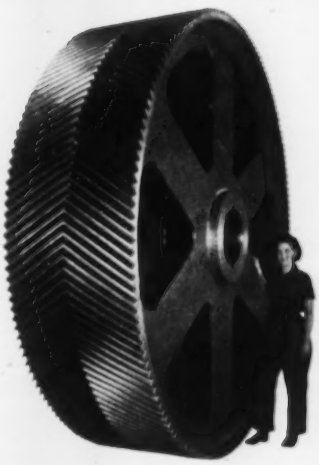
Heavy-duty single reduction unit.



Horizontal right angle unit.



Standard double reduction unit.



Farrel-Sykes herringbone gears are available in any size from ¼ inch to 20 feet diameter, ¼ to 60 inch face, 24 DP to 0.75 DP.

FARREL WILL MAKE EXACTLY THE GEAR OR SPEED REDUCER YOU REQUIRE—

Of importance to you is Farrel's ability to solve your gear or speed reducer problems.

Your requirements alone determine the eventual specifications. There is never any need for compromise.

Farrel-Sykes herringbone gears are made for any power capacity and any speed. Their quiet, vibration-free performance and long life result from extreme accuracy of tooth spacing, profile and helix angle, and other qualities inherent in the Farrel-Sykes method of gear generation. Precision manufacture and the use of highest grade materials also contribute to long gear life.

Farrel speed reducers are available in a wide range of ratios and capacities. Designs include single, double and multiple reduction units, right angle drives and drives to meet special requirements. All are unusually adaptable. Gears and pinions can be proportioned to meet specific load, speed and service requirements. Input and output shafts can be varied in size, in material, and in extension. Even some housing dimensions can be modified.

Farrel engineers will be glad to assist you in working out your gear or speed reducer problems.

FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
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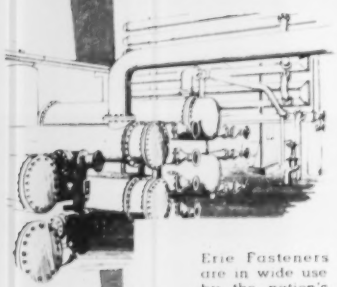

Erie Fasteners are in wide use by the nation's leading Refinery Equipment builders.

Skilled craftsmanship and 40 years of experience backed by modern production equipment result in the use of the correct metal, precision machined, heat treated and rigidly inspected to meet your strictest specifications on special bolts and studs. To be sure of high quality fasteners for railroad, refinery and chemical plant equipment, diesels, farm machinery, excavating equipment and all types of heavy machinery, send your specifications to Erie.

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USES OR PROSPECTIVE USES FOR GLASS-TO-METAL TERMINALS

Relays	Rectifiers
Transformers	Batteries
Capacitors	Diodes
Crystals	Heating Elements
Thermostats	Meters
Switches	Gyroscopes
Transistors	Accelerometers
Resistors	Filters
Vibrators	Transducers

sheared gaskets or omitted parts could be expected occasionally.

Rugged construction of the one-piece terminals is best illustrated by describing the welding operation where temperature at the point of weld is about 2300° F, near the melting point of the steel. Ram pressure of the welder goes as high as 6000 pounds. The 0.055-inch thick terminal skirt forms the contact for the annular projection weld when brought into contact with the edge of the hole in the 0.120-inch thick compressor shell.

Versatility Plus — Another example of cost saving as well as the versatility of these terminals is demonstrated in the southwest area of Ontario, Canada. The Hydro Power Commission there is faced with the problem of changing power from 25 to 60 cycles. The commission asked one refrigerator manufacturer to build dual frequency compressors that would facilitate the change.

In so doing, it was necessary to use a seven-pin terminal, and this unit was designed so a serviceman merely removes the plug, turns it one pin clockwise, plugs it in and the unit will then operate on the new 60-cycle power. This design is saving the commission approximately $80 per unit since it eliminates necessity of buying the user a new unit when the power is stepped up to 60 cycles. Experience gained with the three-pin feed-through terminal enabled the manufacturer to quickly design this dual-frequency terminal.

Now that glass-to-steel hermetically sealed electrical feed-through terminals have proved their worth and value during the past few years, their use will enable many other firms to reduce cost and improve quality.

For Atlantic Automatic Co., Cleveland, Ohio:

Tool Life Increased Over 200%!

PARTS FOR GEARS & CAR TRANSMISSIONS are just a few of the many delicate machine tool products Atlantic turns out. Cities Service Chillo Cutting Oil has helped Atlantic maintain their great reputation for quality products.

For the services of a Cities Service Lubrication Engineer... Write Cities Service Oil Company, Sixty Wall Tower, New York City 5, New York.

CITIES SERVICE
QUALITY PETROLEUM PRODUCTS

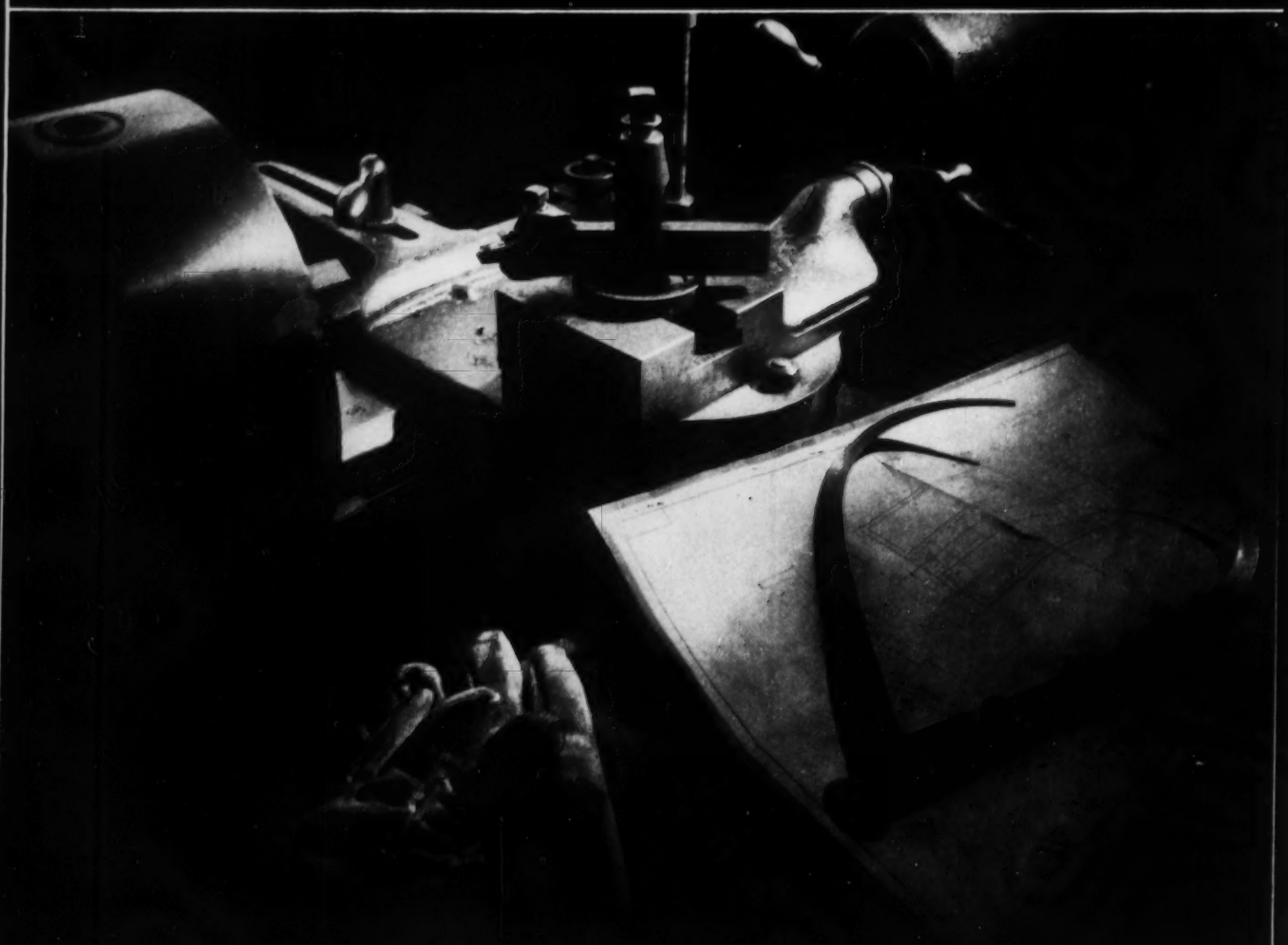
"Cities Service Chillo Cutting Oil Has Proved To Be The Difference Between Ordinary And Quality Production In Our Shop!"

Here's Atlantic Automatic's story in their own words: "One of our tougher jobs recently was machining SAE 446 Stainless Steel with two forming, one threading and three drilling operations. The critical operation was drilling a .025 inch diameter hole, ⅛ inch deep. The drill would soon pack with chips and break. When a Cities Service Lubrication Engineer was called in, he recommended our using Chillo 44.

"This light-colored oil did the trick. DOWN TIME WAS CUT IN HALF AND DRILL LIFE INCREASED OVER 200%!

"We use Cities Service Chillo 44 to machine all types of metals covering a range of machinability from brass to stainless on our Brown and Sharpe 00G, 0G and 2G Automatics. It has proved to be the difference between ordinary and quality production in our shop!"

WHY IT PAYS TO BUY STEEL FROM WAREHOUSE



You don't lose production time waiting for steel!

WHEN YOU BUY STEEL FROM WAREHOUSE, YOU GET:

- LOWER INVENTORY COSTS
- LOWER SPACE COSTS
- LOWER TIME COSTS
- LOWER CAPITAL INVESTMENT
- FASTER PRODUCTION
- FEWER INVENTORY LOSSES

You don't have to adjust your production schedule to match mill rollings when you use a U. S. Steel Supply warehouse as your own. We can make deliveries to suit *your* convenience. The stocks in our *local* warehouse and the resources of our 14 other warehouses promise delivery of the steel you need when, where and in the condition you want it. Contact your U. S. Steel Supply salesman.

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UNITED STATES STEEL

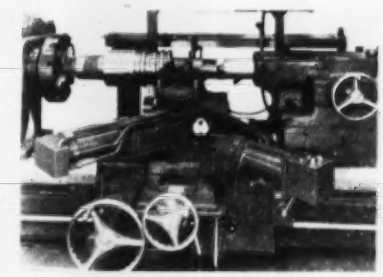
NEW PRODUCTS and equipment

Reply card on page 121 will bring you more information on any new products and equipment in this issue

Automatic Cylinder Selector

. . . addition to manual control

Cylinder selector, electrically operated and working off the template, automatically selects correct operating cylinder and instantly makes the change from one cylinder to the other at the proper time. This is in addition to, not in place of, the manual control.



A selector switch located on the control box attached to the right-hand cylinder provides selective means for manual or automatic control at the operator's discretion. Lights keep the operator visually informed as to which cylinder is in operation. American Tool Works Co.

FOR MORE DATA—CIRCLE REPLY CARD NO. 1

Liquid Paint Stripper

. . . cleans in one run-through

A new approach to the problem of chemical stripping of paint and other organic finishes from steel, magnesium and zinc castings has been developed with the Liquid Stripper No. 6. It will remove organic finishes in one run-through, without harm to the metal surface.

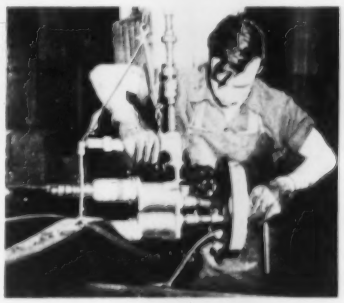
Stripper is safe, involves no fire hazard, no odor, no fume and is nontoxic. It converts the paint film into a soluble form and contains no chemicals which cannot be flushed through sewers. Northwest Chemical Co.

FOR MORE DATA—CIRCLE REPLY CARD NO. 2

Multiple Nut Setter

. . . sets to individual torque

Keller announces development of a multiple nut setter that will set from two to five nuts simultaneously, each to an individual torque. On the production line, a torque deviation of 3 per cent or less is entirely feasible.



After the integral torque regulator is set, the setting is held indefinitely.

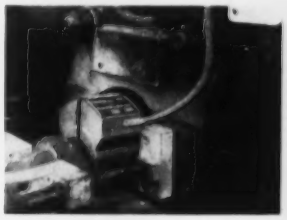
The only specially-made part is a mounting plate which positions the motor units. Plates are made of ½-inch steel, and can be made up as needed in any machine shop or tool room. The units are bolted to the mounting plate and are easily removed for conversion to other production jobs. Keller Tool Co.

FOR MORE DATA—CIRCLE REPLY CARD NO. 3

Nozzle Temperature Control

. . . nozzle freezing ended

A Thermaband nozzle electric heater giving close temperature control solves nozzle problems that confront die casting manufacturers. Elimination of freezing of die casting material in the nozzle at the end of the casting cycle, elimination of uncontrolled nozzle warping and reduction of the tendency of the nozzle heater to over-heat the die are some of its assets. Thermel Inc.

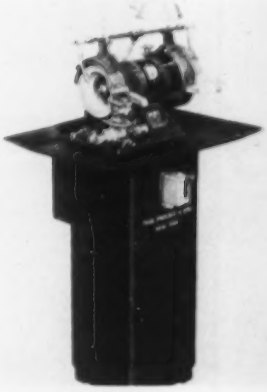


FOR MORE DATA—CIRCLE REPLY CARD NO. 4

Precision Wet Grinder

. . . no localized overheating

Prosser announces the development of their precision grinder, adapted for full wet grinding. The new model produces a mirror finish and durable, straight cutting edges ground to exact angles on all single point tools, high speed steel, cast alloys or carbide.



The tool holder permits rocking the tool by hand across the entire face of the wheel, eliminating

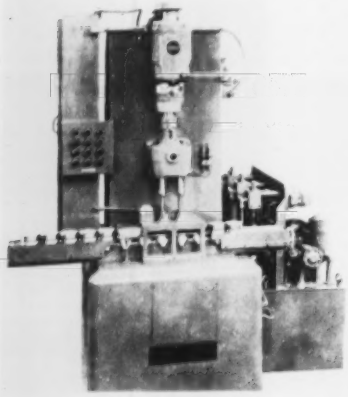
rigid pressure and localized overheating encountered with a surface grinder, reducing the danger of cracking hard tools and eliminating scoring and grooving of wheels. Thomas Prosser & Son.

FOR MORE DATA—CIRCLE REPLY CARD NO. 5

Piston Milling Machine

. . . 1400 pieces per hour

Turner Brothers introduces a newly designed three-station, transfer-type piston milling machine. Designed to spot mill two



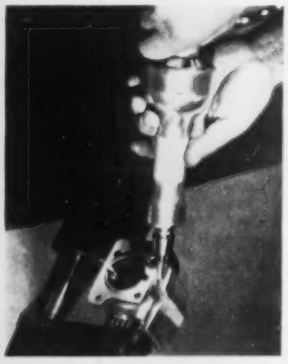
center bosses at once, flush with the top finish surface of the piston, it will produce 1400 workpieces per hour at 100 per cent efficiency. Turner Brothers Inc.

FOR MORE DATA—CIRCLE REPLY CARD NO. 6

Hand Grinder, Miller

. . . cuts nonoperating time

Lorantco hand air turbine grinder and miller is made in three



sizes to perform grinding, milling and polishing operations at 85,000, 70,000 and 55,000 rpm. Its light weight makes for easy handling and accurate work. Air driven turbine provides a wide range of spindle speeds designed for use with tungsten carbide and high speed steel burs, precision grinding points, abrasive and diamond impregnated wheels, eliminating laborious finishing operations on a wide range of work.

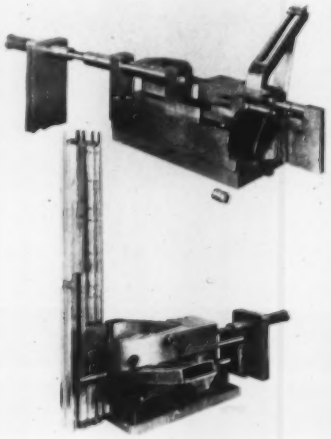
The tools can be used to cut down nonoperating time in sharpening a wide range of high speed steel and tungsten carbide cutting tools because it is not necessary to remove the cutting tools from their holders. Newage International Inc.

FOR MORE DATA—CIRCLE REPLY CARD NO. 7

Automatic Leaders

. . . no auxiliary power source

National Broach has developed a line of Red Ring automatic leaders designed to speed output of



externally-broached round parts on conventional dual ram vertical broaching machines. The loaders, made in a variety of types to accommodate specific parts, feature magazine feeds and simple, compact feed, clamp and eject mechanisms.

No auxiliary power source is required to actuate the loader mechanisms since in-and-out travel of tables is utilized to impart motion to loader feed and clamp components. Output of the loader is limited only by the speed of the machine. National Broach & Machine Co.

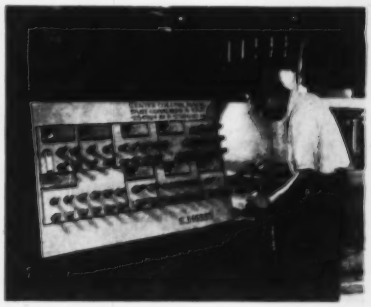
FOR MORE DATA—CIRCLE REPLY CARD NO. 8

Tool Replacement Board

. . . efficient replacement system

This special tool board is manufactured to provide an improved, more efficient system for replacing tools on a transfer type and other multiple spindle machines. It's equipped with a complete set of 56 drills and reamers ready to replace broken or worn tools instantly.

Each cutting tool is graphically identifiable as to size, station, tool



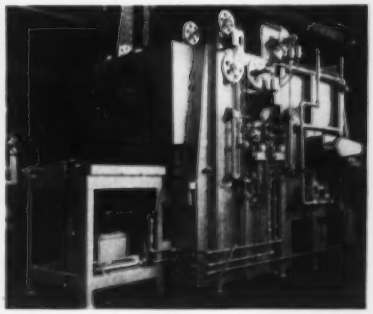
number and adapter size. An important part of this method is the standard presetting gages, which simplify and speed accurate setting of tools. Duplicating the holding method of the machine, they eliminate in-the-machine adjustments and machining of sample parts to check accuracy of depth settings. Scully-Jones & Co.

FOR MORE DATA—CIRCLE REPLY CARD NO. 9

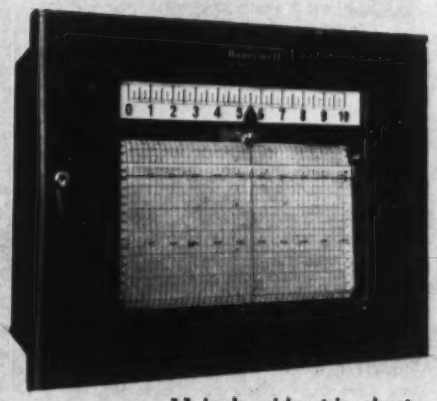
Radiant Heating Furnace

. . . gas or electric fired

Westinghouse has developed a radiant heating furnace for general application. A horizontal,

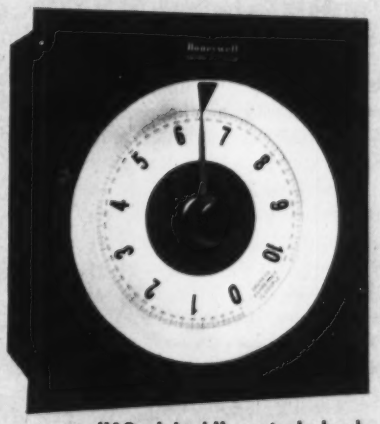


single-end, batch-type model with built-in quench, it can be either gas or electric fired. Furnace is arranged to be used with any of



11-inch-wide strip chart

28-inch-long scale



"12 o'clock" control check

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Laboratory accuracy for *production control...* with *ElectroniK* instruments

FOR the last fourteen years *ElectroniK* instruments have been an important part of the industrial scene . . . for they were the first to bring high-speed, continuous measurement and control into practical reality in industry.

They made news then, by placing laboratory accuracy in the hands of production men . . . permitting them to achieve improvements in quality and efficiency that can be obtained only through more exact process control. And they're still making news today . . . helping to guide complex, precise, process operations.

These versatile instruments can measure, and often control, practically any process variable . . . temperature, flow, pH, conductivity, humidity, weight and dozens of others. They are available as indicators, recorders, and electric or pneumatic controllers . . . in many control variations, capable of handling the toughest assignments.

An outstanding record of dependability, accuracy and ease of maintenance has earned *ElectroniK* instruments an enviable reputation of accomplishment throughout industry. This stems from rugged, service-tested design of every component . . . design that assures uninterrupted service, optimum operation.

Your local Honeywell engineering representative will be glad to discuss how *ElectroniK* instruments can help in your lab or plant. Call him today . . . he is as near as your phone.

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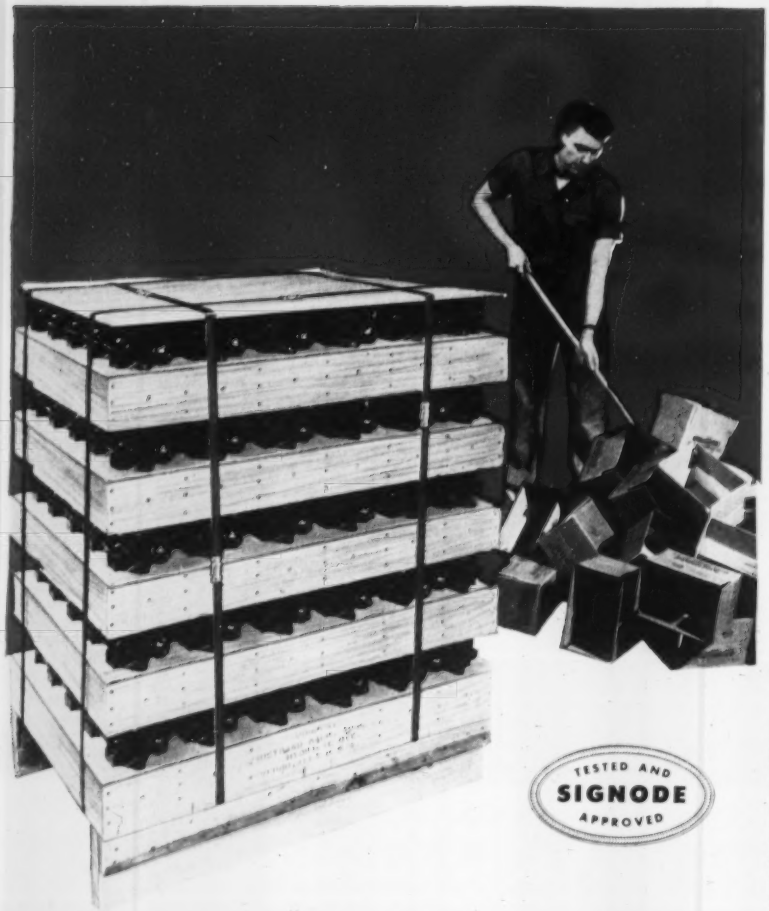


How to make 150 containers disappear

Another example of packaging magic that couldn't be performed without Signode Steel Strapping!

The pallet load shown here contains 150 sub-assemblies, nested on returnable wooden trays, packaged for easy handling and shipping by strong bands of tensioned Signode Steel Strapping.

This method of packaging eliminated the use of 150 individual containers, and the materials needed to pack and seal them. Units were handled *once*—at the assembly line, where they were placed on the trays. Strapped to the pallet base, which also served as a tray, the trays became a single, pilfer-proof unit, easily handled by *one* man and a fork truck!

If you now ship by pallet or have products which can be shipped that way, and the economies apparent in this method of product packaging, handling and protection interest you, we will gladly supply detailed facts. Write Signode Steel Strapping Co., 2645 N. Western Ave., Chicago 47, Ill. Offices coast to coast. In Canada: Canadian Steel Strapping Co., Ltd. Foreign subsidiaries and distributors world-wide.

SIGNODE Steel Strapping Co.

SEND FOR FOLDER SHOWING 6 BASIC WAYS OF UNITIZING

the standard atmospheres. Only one operator is required because the only manual operations are loading and unloading.

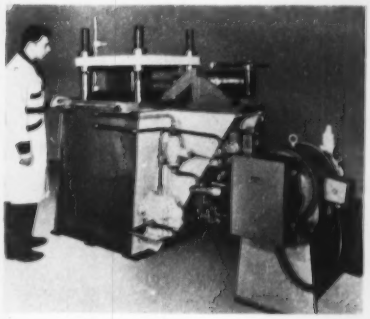
Temperatures up to 1850° F are possible, with hourly output from 200 to 400 pounds net depending on sizes and shapes. The furnace can be used for bright hardening, carbonitriding, carburizing, martempering, normalizing, nitriding or stress relieving. Westinghouse Electric Corp.

FOR MORE DATA—CIRCLE REPLY CARD NO. 10

Hydraulic Press Line

. . . over-all height reduced

Line of inverted vertical hydraulic presses is adaptable to a wide variety of stamping and extrusion operations. Presses have hydraulic control cylinder in the base, a design feature intended to reduce over-all height, avoid



shut height limitations, lower center of gravity and provide areas at top and sides for the mounting of auxiliary hydraulic cylinders.

Press line is adapted to bending and extrusion operations on ferrous and nonferrous parts as well as upsetting, drawing and coining operations. Stampings requiring deep draws and additional auxiliary operations can be simply produced on these presses. Multiple operations such as piercing or de-

(Continued on p. 124)

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Just circle the corresponding number of any item in this section for more information.

INFORMATION

AVAILABLE FOR THE ASKING

66. Metals, Alloy Summary

H. K. Porter Co. Inc., Alloy Metal Wire Co.—A 37-page handbook is ready for distribution to assist in choosing metals or alloys for a particular application. Physical and mechanical properties of nickel alloys are summarized, with typical applications to give a general idea as to which of the Inco nickel alloys provides the combination of properties to meet a specific metal problem in wire, strip and rod.

67. Foundry Gas Review

Whiting Corp.—"Review of Foundry Gases and Temperatures" is now available on request. It is a review of the 1914 edition done by A. W. Belden and achieves even greater importance in the light of more recent information on cupola behavior. Editing is by H. W. Lownie Jr., Battelle Memorial Institute, and is designed to help foundrymen understand many of the troubles encountered from low beds and oxidized iron.

68. Shell Molding

Union Carbide and Carbon Corp.—With three new silicones, specially designed as shell mold release agents, shell molds are now being released from patterns in foundries with ease and efficiency. Foundrymen can choose from an extremely stable emulsion stock, a ready-to-use solution, and a modified silicone made available for users who prefer to make up parting solutions in their own plant. These three silicones are described in an 8-page booklet available from the manufacturer.

69. Safety in Welding

Air Reduction Co. Inc., Air Reduction Sales Co. Division—A sound slide-film on safety in the use of oxyacetylene cutting and welding equipment, titled "The Guy Behind Your Back" is a fundamental approach to safety factors. Specifically designed for companies to train their own employees, the 20-minute story is presented with use of many cartoons and easy-going narrative.

70. Progressive Services

Progressive Welder Sales Co.—A 4-page brochure shows the facilities of Progressive Welder. It locates and describes major engineering and manufacturing service and facilities in Kalamazoo, Vicksburg, Pontiac, Warren and Detroit, Mich.

71. Polyester Resin

General Electric Co.—A 7-page bulletin describing its new polyester resin is being offered by G. E. According to the manufacturer, this resin offers chemical and heat resistance superior to that offered of conventional styrene polyester resins. The resin is described as reinforced with glass fiber and is corrosion resistant, of high strength and lightweight.

72. Copper Plating

Brad Foote Gear Works Inc.—New in the general gear field is the announcement that material shipped on all orders received on and after January 1, 1954 will be copper plated. An 8-page catalog is offered to explain the complete details of the program.

73. History of Strapping

Signode Steel Strapping Co. — Growth of the steel strapping industry paralleling the 40 years history of Signode is graphically told in an illustrated booklet. It chronicles the history of protective packaging and shipping with events leading up to introduction of the first tensioning and sealing tools. The 20-page report concludes with review of modern steel strapping methods.

74. Stainless Tube Selector

Babcock & Wilcox—Bulletin TDC 160 assists in selection of stainless tubing and pipe for corrosion resist-

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Penton Building, Cleveland 13, Ohio

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ant applications. The 8-page folder contains information on the comparative corrosion resistance of stainless steels to corrosive media. It presents pertinent data on six widely-used stainless tubing steels and several hundred corrosive media at various temperatures and concentrations.

75. Standards' History

American Standards Association—"Through History with Standards" is a serious text humorously illustrated telling the story of many industries and organizations that have been helped by the adoption of standard dimensions and procedures. A readable approach to a complicated subject, it shows how standards make things easier and less expensive.

76. Guide To Carbides

Kennametal Inc. — Specifications and net prices of cemented carbide products are listed in a 72-page catalog released by Kennametal. Emphasized is the expanded line of profiling tools. The catalog is divided into five parts covering blanks, brazed tools, mechanically-held tools, Kennamills and technical data. Illustrations, charts and tables are employed to advantage.

77. Aircospot Operation

Air Reduction Sales Co.—A 4-page folder details features of the Aircospot process and equipment. Physical and electrical specifications and operating data are given on the inert gas-shielded spot welding gun.

78. Building with Aluminum

Aluminum Company of America—Story of maintenance-free characteristics of aluminum as a building material is told in a 16-page booklet, describing corrugated aluminum roofing and siding. Installations in excellent condition after 20 years service in industrial areas are outlined to the reader.

79. Tool Steels

Bethlehem Pacific Coast Steel Corp. — "Bethlehem High-Speed Tool Steels," an illustrated booklet describes the company's 66HS, HM, M-10, Special HS, and Comokut tool steels. Application, typical analysis, heat treatment and characteristics of these five tool steels are set forth.

80. Brake Die Guide

Service Machine Co. Inc.—A guide for selection of proper types of brake dies for bending and forming sheets of steel and other metals and a chart of 26 standard styles is made available by Service Machine. Sharp bends, scalloped designs, angular shapes, contours and folds are among these standards. Two and three stage types of dies, as well as spring loaded and rocker types, are also included.

81. Polymer Sources

M. W. Kellogg Co., subsidiary of Pullman Inc.—Sources of Kel-F polymer materials, finished products, as well as corrosion control application services offered by more than 75 U. S. and Canadian companies, are available in a quick-reference buyers guide. This 16-page guide permits ready selection of companies specializing in molding and fabricating products of Kel-F.

82. Speed Tallying

Remington Rand Inc.—One-day inventory totals, despite heavy seasonal demands, are offered with the Speed Tally manufactured by Remington. Complete details of the new machine and how it functions in inventory record-keeping are described in a new 4-page folder, EL148.

83. Magnetic Amplifiers

Westinghouse Electric Corp.—Current and potential transduction magnetic amplifiers developed for instrumentation, metering and control of d-c currents and voltages requiring isolation are described in an 8-page technical data booklet. A definition of the term magnetic amplifier is followed by an explanation of the theory of operation. A section is devoted to application specifications.

84. Storage Heater Roundup

Patterson-Kelley Co. — Complete line of hot-water storage heaters, useful information on piping arrangements and installation data is presented by Patterson in a 48-page catalog. Horizontal and vertical heaters in steel, copper lined, copper silicon, cement lined, clad and galvanized construction, as well as the low-flow design are each cataloged as to weights, dimensions, construction details and capacities—with conversion tables.

85. Forging, Die Handbook

Allegheny Ludlum Steel Corp. — Smooth hammered forgings, composite die sections and cast-to-shape tool steels are described in 27 page hand book issued by Allegheny. Subjects covered include: Available forged shapes; weight limits; how to use and order composite die sec-

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tions to effect substantial tool steel economies; time savings in die making and a guide to uses and types of cast-to-shape tool steels. Chemical analyses and heat treating instructions are included for most common cast-to-shape grades.

86. Hardness Tester Specs

Steel City Testing Machines Inc. Illustrations and complete specifications on more than a half dozen different types of Brinell hardness testers, plus miscellaneous accessories, are included in bulletin B-953. The file-size 8-page reference explains some of the principles of Brinell hardness testing and ASTM standards on the subject.

EDITORIAL REPRINTS:

87. Nondestructive Testing

S. A. Wenk, Battelle Memorial Institute brings you up to date on the latest production line equipment and methods for inspection and testing. Mr. Wenk's STEEL article indicates a wide variety of equipment is available to meet industry's diverse needs.

88. Rollmaking

A seldom-described operation in the steel industry—rollmaking is going modern. An article in STEEL tells how, in keeping up with demands of the metal rolling industry, rollmakers are refinishing their centuries-old art with the help of modern science. The article is adapted from *Rolling Mills, Rolls and Rollmaking*, the 150th anniversary book published by Mackintosh-Hemphill.

89. Specifications

Dr. Allen G. Gray, STEEL Technical Editor, reports that government specifications used by military departments soon will be limited to two series: Federal and military. Dr. Gray's analysis of the current picture provides opportunity to brush up on your understanding of the spec system.

90. Machinability

Second installment of STEEL's report on machinability is authored by Francis W. Boulger of Battelle Memorial Institute. Mr. Boulger deals with inherent ability of the workpiece material to aid cutting tools as a part of the rapid-machining picture. He shows also how a big part is played by environment—speeds, feeds, etc.

NEWS FROM Femco

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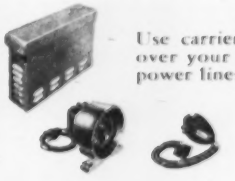

Use carrier current over your existing power lines.

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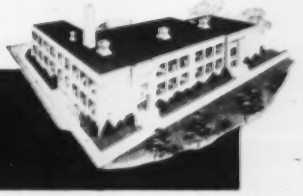


FARMERS ENGINEERING AND MANUFACTURING CO.
IRWIN, PENNSYLVANIA

Specialists in Electronic Communication and Control

forming can be performed during the deep drawing or extrusion operations on these presses. Walter P. Hill Inc.

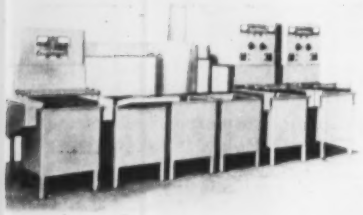
FOR MORE DATA—CIRCLE REPLY CARD NO. 11

Precision Chrome Plater

. . . a package precision unit

Features of the Morey Process for precision chrome plating have been made available to industry. The development of a package precision hard chrome unit by Wagner enables the setting up of complete plating facilities for on-the-spot chrome finishing of production tools and parts.

All equipment needed for a complete hard chrome department is



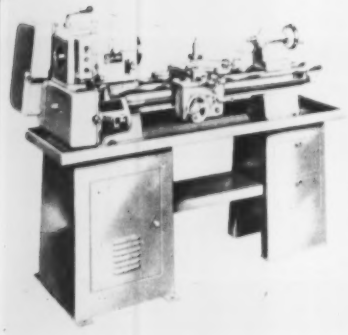
furnished: Six tanks; lead and neoprene tank linings; five rectifiers; a fume separation system; heat and timing controls and electrical connections ready for immediate installation. Wagner Brothers Inc.

FOR MORE DATA—CIRCLE REPLY CARD NO. 12

General-Purpose Lathe

. . . 12-inch Clausing model

Atlas Press offers a new Clausing 12-inch lathe which, according



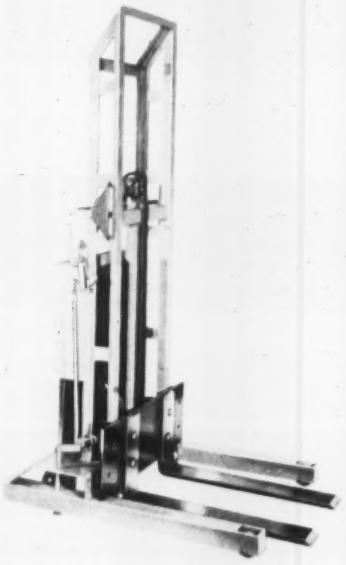
to the manufacturer, offers plus value features not usually available in a 1-inch collet capacity lathe. The lathe is built for production, tool room, maintenance and general machine shop use. Atlas Press Co.

FOR MORE DATA—CIRCLE REPLY CARD NO. 13

Versatile Lift Truck

. . . capacity 1250 pounds

This electric portable lift truck is an addition to Safeway's line of materials handling equipment.



Model EL-20 operates as a fork-lift, straddle-lift, platform-lift and a drum-stacker with a lifting capacity of 1250 pounds.

Designed as a versatile handler for maximum ecomomy, this unit includes many features proved popular on other models such as: Snap-on platform, built-in charger with automatic cut-off; key-locked ignition switch and electronic cut-off switch. Safeway Industrial Equipment Corp.

FOR MORE DATA—CIRCLE REPLY CARD NO. 14

Welding Electrode

. . . for welding mild steel

Electrode, known as Airco Easy-arc 12, is for welding mild steel at speeds reported to double those obtained with conventional types. It is designed to increase speed through addition of a large amount of powdered metal to electrode coating. The powdered metal changes the arc action so that welds can be made by dragging the electrode in contact with the plate.

Weld beads are smooth and weld metal is of high strength, good ductility and excellent x-ray soundness. Airco recommends the electrode for fabrication of mild steel involving plates and rolled sections. Air Reduction Sales Co., Air Reduction Co. Inc.

FOR MORE DATA—CIRCLE REPLY CARD NO. 15

Portable Electric Furnace

. . . readily moved to work

For experimentation, stress relieving, annealing of forgings, drawing, spinning, dimpling, stretching and joggling of titanium castings, forgings and other alloys, Blue M Electric recently manufactured a series of portable air circulating processing furnaces.

The portable electric furnace is readily moved to forming equipment such as punch press and

press brake, with material heated to precise fabricating temperatures. Work pieces are removed from the furnaces, formed and/or punched, etc. while at desired elevated temperatures. Blue M Electric Co.

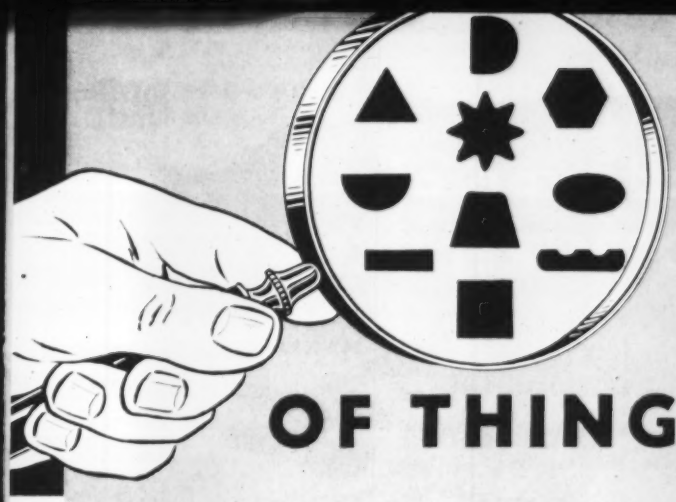
FOR MORE DATA—CIRCLE REPLY CARD NO. 16

Lift, Platform Trucks

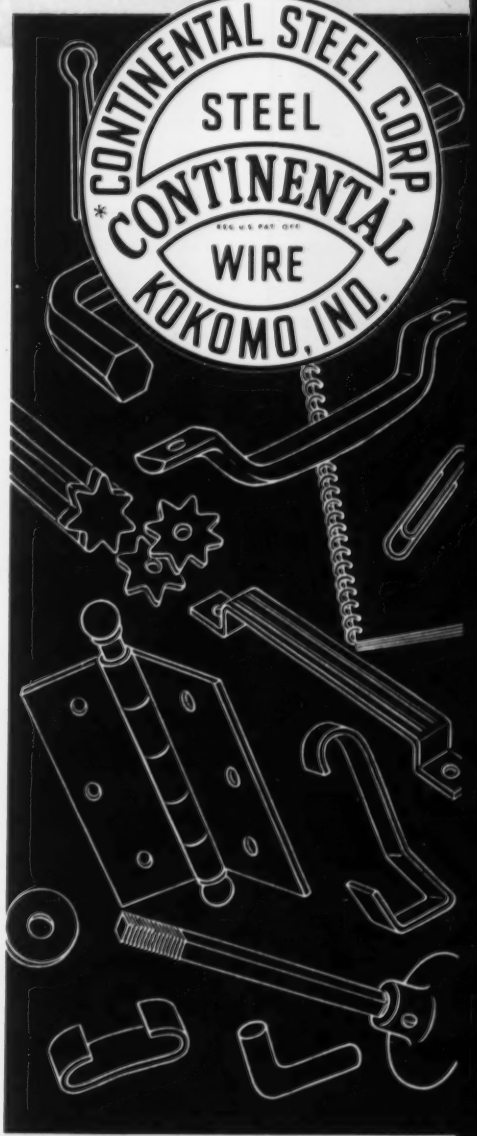
. . . shortest in over-all length

Announcement of the new Powerworker line by Clark includes the report that over-all length is shorter than any other standard truck on the market.

Line includes low lift pallet and platform trucks, telescopic tilting



THE SHAPE OF THINGS TO COME...



Why burden yourself with production and labor problems caused by the need for machined or cast parts that may be damaged in handling . . . or in product use. You can shift these responsibilities and save money too, by using Continental shaped wire. Save the dollars you are now spending for high priced labor, throw-outs, jigs, fixtures and expensive machine tools. Continental is geared for wire production for you—producing finished, sturdy shaped wire for production parts . . . either functional or for eye-appealing trim, in practically any wire shape or size. Join the enthusiastic users of Continental wire . . . users who talk with Continental about their wire problems. Just write or wire Continental . . . without obligation, and benefit from interested, personalized wire service.

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Unless you check up on shaped wire you may continue to buy unnecessarily expensive forgings, stampings or rollings. Our experience with a host of wire users prepares us to help you solve your component-parts, or product-trim problems. It's easy to find out if we can be of help to you . . . just call or write us at Kokomo, Indiana.

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- Key Wrenches
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- Stove and Refrigerator Shelves
- Buckles
- Loose Leaf Binders
- Staples
- Barbeque Grilles
- Bed Spring Border and Brace Wire
- Welding Electrodes
- Cotter Pin Wire
- Small Cams
- Costume Jewelry
- Tie Racks

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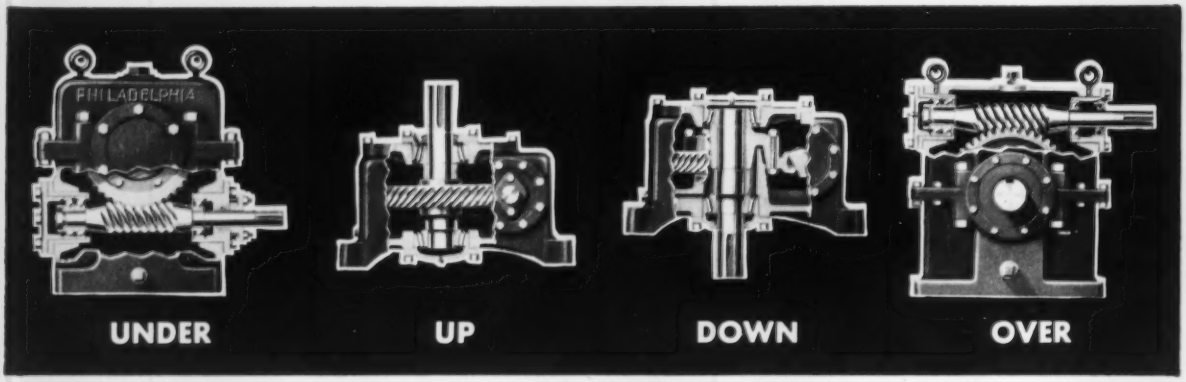

Type "AT" Philadelphia Heavy Duty Worm Gear Reducer, with worm shaft *below* the worm gear.

Type "UT" Heavy Duty, Vertical Worm Gear Reducer, with slow speed shaft extended upward.

Type "VT" Heavy Duty, Vertical Worm Gear Reducer, with slow speed shaft extending downward. (Note "dry-well" construction around downward shaft.)

Type "RT" Philadelphia Heavy Duty Worm Gear Reducer, with worm shaft *above* the worm gear

PHILADELPHIA GEAR WORKS, INC.

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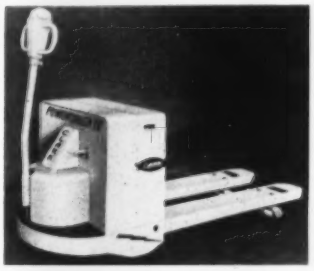
Industrial Gears & Speed Reducers

LimiTorque Valve Controls

fork trucks as well as walk-it-or-ride tractors.

Design features make for maneuverability, stability and quick maintenance. Special safety features are added, such as the brake,



which operates on the motor shaft and transmits its action through a gear reduction of 22 to 1. Industrial Truck Division, Clark Equipment Co.

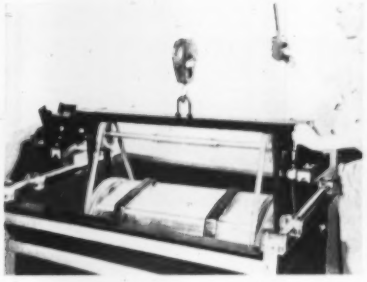
FOR MORE DATA—CIRCLE REPLY CARD NO. 17

Simplified Plating Barrel

. . . no gears and bearings

Savings of up to 100 per cent in maintenance manhours are claimed for this new plating barrel announced by G.S. Equipment. It features a radically simplified mechanism, introducing several developments which increase production and versatility.

Dual v-belt suspension-drive eliminates transmission gears and



cylinder bearings subject to wear and corrosion. Cathode contact is made by a self cleaning, inverted v-block. The superstructure and cylinder assembly fit on other plating tanks of conventional design. Other features: Total immersion of clyinder in solution; no parts other than neoprene rubber and H-T Sincolite are exposed to the solution. G.S. Equipment Co.

FOR MORE DATA—CIRCLE REPLY CARD NO. 18

Automatic Die Stop

. . . fitted in 10 to 15 minutes

A new type automatic and primary die stop is being offered by Danly. Quickly fitted and economical, automobile and primary stop and trip spring are designed and engineered for adaptability to any die and can be fitted in 10 to 15 minutes. They are usable on strippers from 5/16-inch thick.

The stops are available for right or left-hand feedings and are adaptable to blanking, pro-

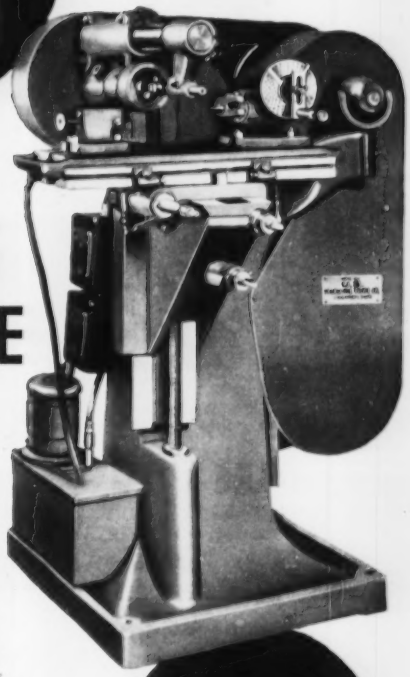
gressive and compound dies. Danly Machine Specialties Inc.

FOR MORE DATA—CIRCLE REPLY CARD NO. 19

"U.S." No.1

CAN DO AS MUCH AND DO IT AS WELL AS MILLING MACHINES THAT COST UP TO TEN TIMES MORE!

HORIZONTAL MILLING MACHINE



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SIMPLE
ACCURATE
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The U. S. No. 1 has long been the nation's number one favorite heavy-duty hand milling machine. Its unusual capacity and simplicity make it adaptable to a wide scope of high speed production operations with air-hydraulic feeds.

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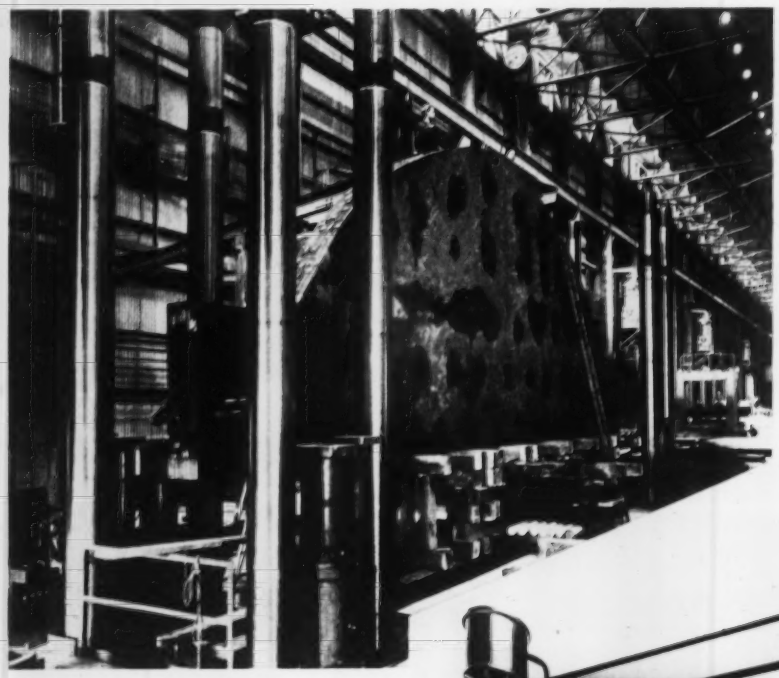
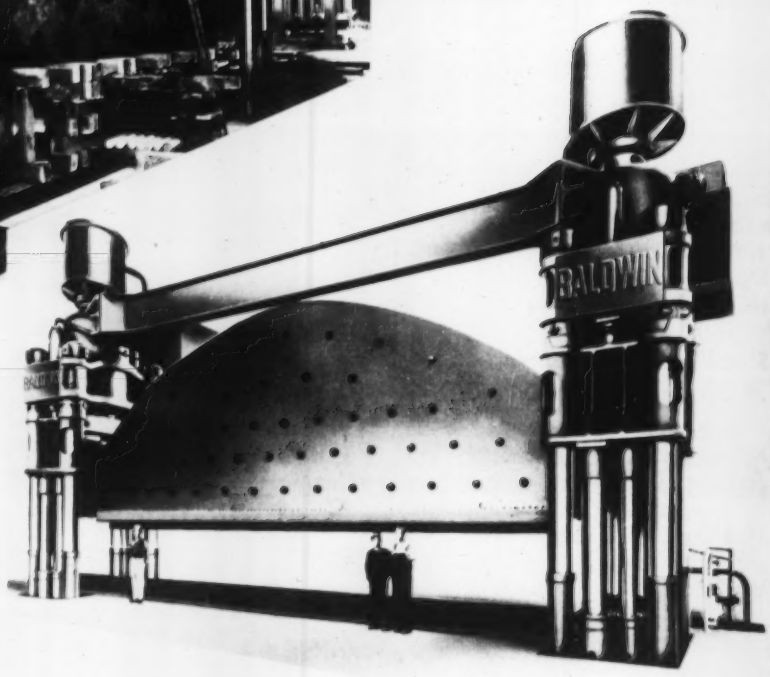


Hydraulic beam press, 8000-ton capacity, goes up in new plant. It will bend 8-inch steel plate. Inset shows how the completed press will look



Equipment *Tailored* For New-Plant Jobs

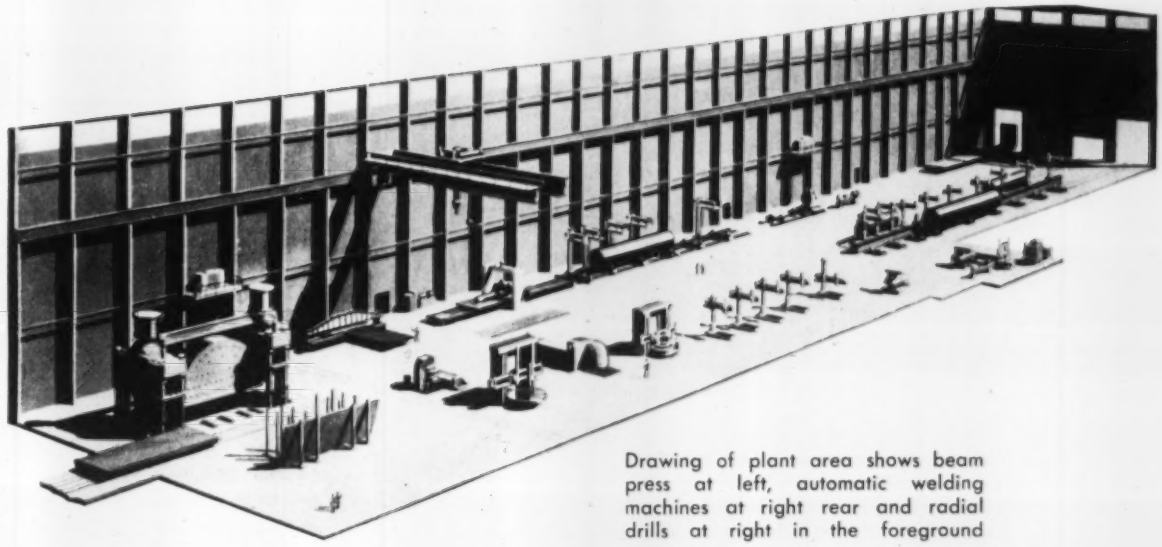
New $5 million plant will turn out pressure vessels. Machine innovations plus a Goliath will be the stars as the plant swings into full production schedules

HYDRAULIC BEAM press will bend hot steel plate eight inches thick. The 8000-ton giant is being installed in the new Foster Wheeler Corp. plant Mountaintop, Pa.

Press is hydraulically operated. Speed of the moving beam is controlled by a single lever. Mechanical linkage connects this lever to four Oilgear reversing pumps, coupled to two 200-hp double-end motors.

Two in One—Actually, the structure combines two four-column presses in one, each with a capacity of 4000 tons. Two sets of columns are coupled together by laminated steel beams—one set attached to the bottom platen and one to the moving platen—to form a single unit capable of exerting loads up to 8000 tons on the plate to be formed.

Each of the 4000-ton sections consists of a cast steel main cylinder, moving platen, pushback cylinders and equalizer cylinders. The columns are shoulderless and of straight-through design permitting removal of any one of them without completely dismantling the press.



Drawing of plant area shows beam press at left, automatic welding machines at right rear and radial drills at right in the foreground

Steel columns are assembled to the main cylinder by split cast steel nuts at the bottom and split steel collars set into a counterbore in the upper surface of the bottom platens. Thus, any of the columns may be removed by drawing it up through the main cylinder column husk.

Plate Handler — Press provides daylight of 96 inches maximum between upper and lower bending beams. All rams have maximum stroke of 60 inches. Top operating speed under no-load condition, up or down, is 82 inches per minute—maximum pressing speed is 12 inches per minute up to 8000 tons.

Unique handling device positions the hot plate. Designed by Baldwin-Lima-Hamilton Corp., builder of the press, the plate-joggling mechanism will handle plates up to 40 tons each. It consists of four 7-inch diameter lift cylinders, eight 3¼-inch diameter manipulating cylinders, rollers, push rods and pins.

Push rods are hinged for back and forth movement on a vertical plane. Vertical stroke of these rods is 13¼ inches. Lifting pins have a horizontal movement of 3 inches to either side of the vertical centerline. Positioning toggles, hydraulically operated, are built into the lower press beam. A seven-gallon-per-minute, 2000 psi Vickers pump is directly coupled to a 7½-hp motor and operates the device.

Entire press occupies a surface area 20 x 65 feet. Height above floor level is 38 feet, with 22 feet extending into a pit below floor level. Press rests on reinforced concrete foundation.

Movable Drills—Arrangement of drilling equipment for the new plant is designed to permit maximum utilization of each drill. Plant is equipped with two sets of high speed radial drills. Each has an 8-foot arm and 19-inch column. Drills are mounted and arranged in a set of six, with the two end drills fixed. Another set consists of four drills, with one end drill fixed.

Radial drills are mounted along a 230-foot section of raised track and may be positioned, by power equipment, anywhere along the ways. Drums or other pressure vessels to be drilled will be placed on both sides of the ways and laid on power rolls that permit easy turning of the cylinders.

With this arrangement, any combination, using up to six drills on a single drum, will be practical. This also permits 100 per cent use of the drills at all times, regardless of the number or size of units to be drilled.

Weld on the Move—Welding system chosen for the plant consists of power-driven machines which rest on bases that can be raised or lowered to accommodate vessels up to 12 feet in diameter and which travel on a 150-foot track.

Units are automatic flux recovery, power driven booms which are remotely controlled. Welders can handle plate 8 inches thick.

While there is little difference in quality of weld obtained between alternating current and direct current, the direct current system was chosen because of the arrangement whereby the entire welding unit travels over the track. Being lighter, the dc unit has advantage of eliminating bulky transformers which would have to travel with welder along the track.

Contact with power source is obtained by a hidden track below the floor. Power consumed by one of the welding units is about 50 kw. When circular seams are welded the machine is held in one position and the drum is revolved by power rolls.

When Jobs Reach PROCESS ENGINEERING . . . Call FEDERAL for GAGE ENGINEERING

Complete Set of Gages . . .

Engineered by FEDERAL for Inspecting the Working Parts of an Automobile Sub-Assembly

Photo shows Gages for use at production and at final inspection. All these Gages were engineered directly from customer's Process Sheets and were designed from the sample parts shown and from blueprints. Each Gage checks a different dimension and is shown with its *single* master (not *two*).

WHEN YOU *START* TO PROCESS YOUR JOBS, that's the time to take advantage of our years of experience in designing every sort of dimensional visual gage. Our engineers know how to set up your gaging requirements and save you time and money.

At Federal we know the basic difference between designing and building precision gages and designing other mechanical products. Designing precision gages requires knowledge of how to *magnify* and *transfer* measurement variations *precisely*, without *loss* of motion — with a minimum of *friction* and *inertia* in the working parts — and a hundred other details which do not concern the usual tool and machine designer.

No matter whether it's an Air or Automatic Gage or a Dial Indicator type, there is every reason you should get better gages if Federal designs and builds them. Call in Federal when you *start* processing a job and let us engineer your gages for you. Federal Products Corp., 1212 Eddy Street, Providence 1, Rhode Island.

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Largest manufacturer devoted exclusively to designing and manufacturing *all types* of DIMENSIONAL INDICATING GAGES

Raceway Gets Fast Cut

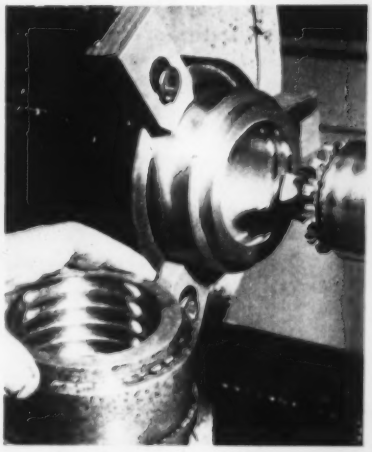
THREAD MILLING of ball raceways in actuating nuts is being handled with tungsten carbide-tipped cutters at the plant of Vard Inc., Pasadena, Cal. Cutters are produced in various diameters and tooth radii in Vard's tool room.

Typical operation is on an SAE # 8620 (70 to 90,000 psi tensile strength) steel main-gear actuating ball nut in which the raceway's major diameter is 3.062 inches. Sixteen and three-quarter turns or threads are milled in the raceway at 18 ipm (rotation of workpiece), 0.0045-inch chipload per tooth, 328 rpm (cutter rotation) and 0.100-inch depth of cut. About 0.007-inch stock is left for finish grinding after heat treating. Carbide cutter turns clockwise while the workpiece is turning counter-clockwise.

Equipment Modified—Machining is done on a Shields thread mill modified with a 100-pound flywheel on one end of the quill through which coolant is piped.

Cutter is 2.5-inch diameter with 12 Kennametal K4H teeth of 0.153 to 0.154-inch radius, 3-degree negative radial rake and zero-degree axial rake. A 5-degree positive axial rake on alternate teeth was tried, but it increased grinding costs without improving finish or cutter life, so it was dropped.

Various grades of carbide first used gave only two or three pieces per grind. Now, nine pieces are easily machined between grinds.



RACEWAY SPEEDSTER
. . . tool life up 300 per cent

Aircraft Hose Clamps

Superior Stainless

gives them stay-put strength
and greater manufacturing ease

Among many vital needs, the great planes of our worldwide defense system require hose connections that are absolutely safe and sound. Here, stainless steel serves with admirable efficiency resistant to corrosion, tough and strong. • In hose clamp manufacture, SUPERIOR STAINLESS brings extra benefits of exactness in gauge, temper and finish for better workability, finer product performance. *Write us regarding your applications.*

Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA

when M.P.H. means

MICROHONING'S PRECISION HELPS

IN TWENTY-FIVE YEARS the airplane has increased its speed tremendously. Any conception in 1929 of traveling faster than sound was relegated to the fantasy of the comic page.

But stronger metal-alloys, new designs and the development of more accurate metal-processing methods have made "sound-breaking" advances possible. The Microhoning process, which combines stock removal with geometric accuracy, size control and consistent surface finish, is one of the most precise production methods being used.

During the past twenty-five years, in which it has led the honing field, Micromatic has continued to develop its Microhoning process to meet the needs of industry. For example, today, Microhoning's precision is helping the airplane achieve supersonic speeds.

Through such aids as Microhoning, the comic page fantasy has been moved to the front page of reality.

MICROHONING = STOCK REMOVAL + GEOMETRY + SIZE CONTROL + SURFACE FINISH

1929 • 1954
25TH YEAR OF DEVELOPMENT
PRECISION PRODUCTION THROUGH MICROHONING
MICRO MATIC
TRADE MARK

MICROMATIC HONE CORPORATION

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Pendleton, Indiana

REPRESENTATIVES: Allied Northwest Machine Tool Corp., 103 S.W. Front Avenue, Portland 4, Oregon. • Tidewater Supply Co., Charlotte 4, North Carolina.

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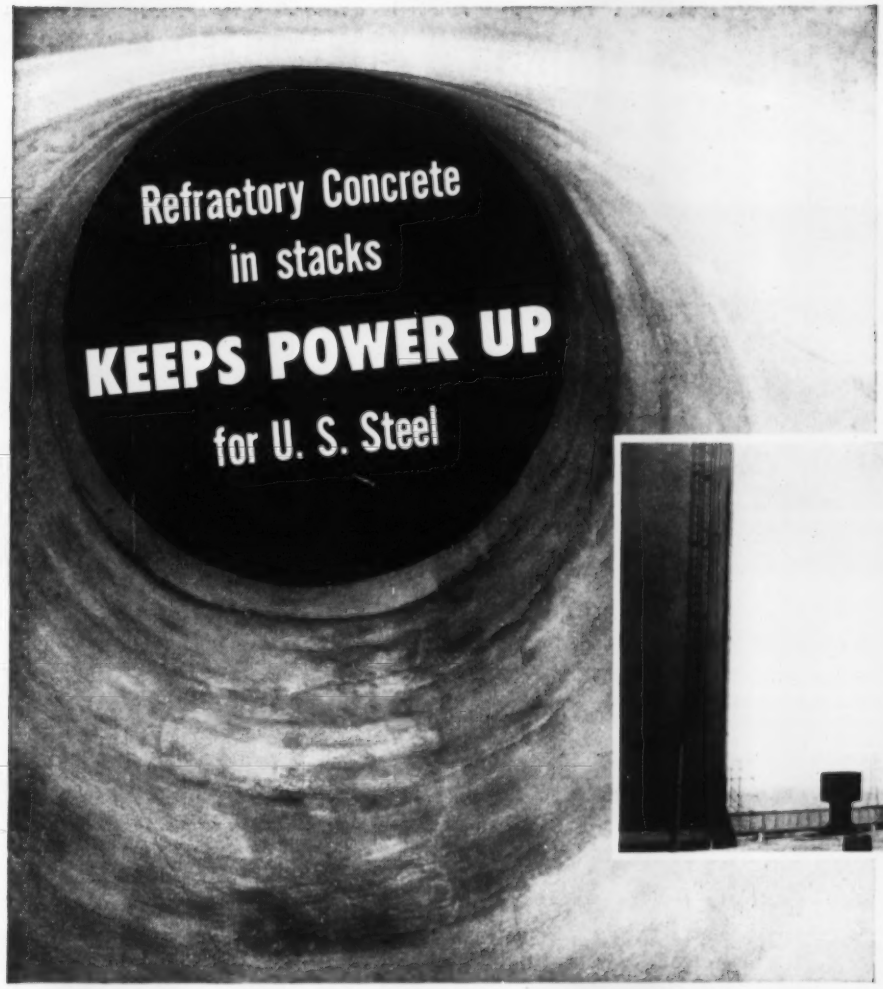
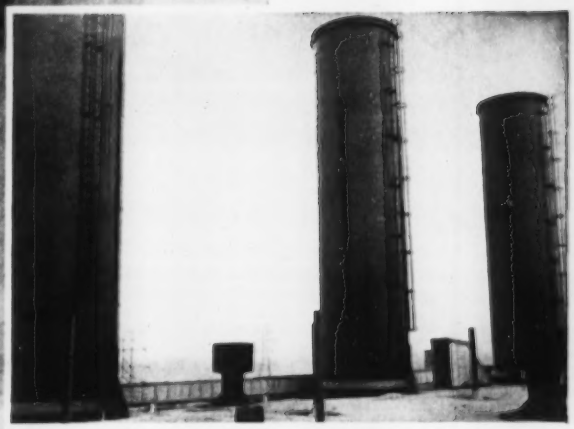




FAST WORK—Each 14′ 10″ i.d. x 61′ 6″ high stack got a 2½″ lining of Refractory Concrete in just 4 days after reinforcing wire mesh was attached. Concrete made with Lumnite Cement and traprock was "shot" on by cement gun.

You're looking down

the smooth, jointless Refractory Concrete lining that protects a power stack at the new Fairless Works. It's the way U. S. Steel assures long, trouble-free stack life. Here's why:

Saves time. Fast, monolithic construction is further speeded by the ability of Refractory Concrete made with Lumnite* Cement to reach service strength in 24 hours or less! *Helps draft.* The one-piece lining prevents "breathing." *Gives long-lasting protection.* Lumnite-made Refractory Concrete resists attack of sulphurous gas and abrasive fly ash, takes heat to 2600°F, has low volume change and withstands thermal shock.

Whether you're lining or rebuilding a stack, it will pay you to look into the enviable record of Refractory Concrete made with Lumnite calcium-aluminate cement—in power, metals and refining industries . . . in fact, wherever heat, corrosion or abrasion are problems.

FOR CONVENIENCE, you may prefer to make Refractory Concrete with prepared castables (Lumnite Cement plus aggregates selected for specific temperature and insulation service—add only water). They're made by refractory manufacturers and sold through their dealers. For more information, write Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

**"LUMNITE" is the registered trade mark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.*

S-L-718

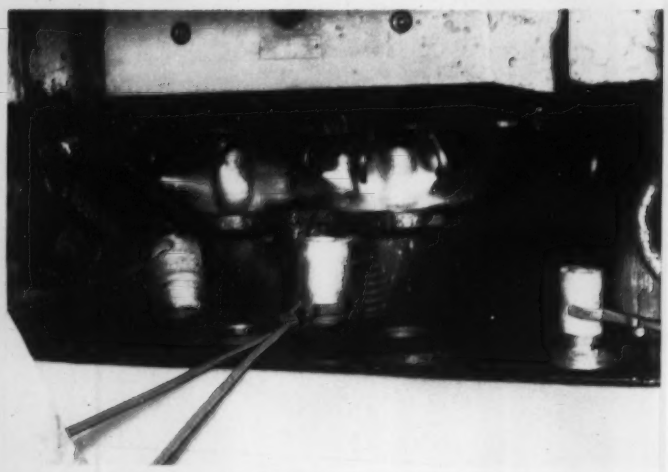
ATLAS® **LUMNITE for INDUSTRIAL CONCRETES**

REFRACTORY, INSULATING, OVERNIGHT, CORROSION-RESISTANT

A UNIVERSAL ATLAS PRODUCT

UNITED STATES STEEL HOUR—Televised alternate weeks—See your newspaper for time and station.

500 81-MM Shell Blanks Per Hour on a 1,600-Ton High Speed Forging Maxipres!



Upset slugs, heated to 2100°F., are cupped by extrusion, then shaped in forming die. High-pressure jets of mixed air and water keep punches and dies cooled to about 550°F.

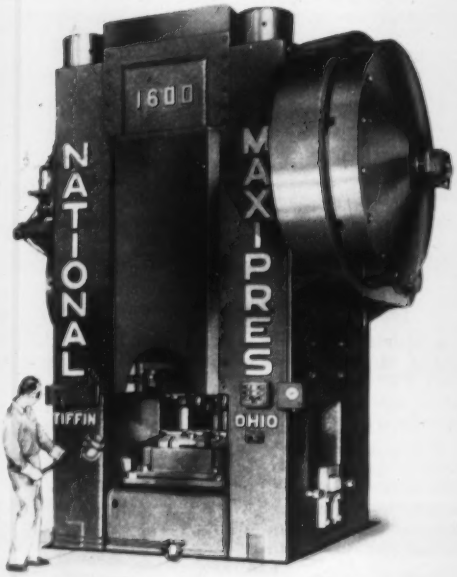
Slugs for 81-MM mortar shells are sheared from 2½ inch round bars of carbon steel. Slugs are then upset preparatory to extrusion (center illustration).

Upset slugs are extruded, then formed into cups (right).

● An outstanding production record is being established at Rheem Mfg. Co., progressive West Coast ordnance forgers, where 81-MM mortar shell blanks are being forged on a 1,600-ton National MAXIPRES at the rate of 500 blanks per hour!

Dies, developed in cooperation with NATIONAL engineers, are giving exceptionally long service. The punches have produced 14,000 to 16,000 pieces, average. After forming 15,000 cups, one die was polished, and produced another 63,000 pieces before showing much wear!

If you have a forging problem—large or small, hot or cold, ferrous or non-ferrous—let us help you solve it. Send us prints, or a sample part, or, better yet, visit us. No obligation.



MAXIPRESSES are available in 13 sizes from 300- to 8,000-ton.

NATIONAL MACHINERY COMPANY

TIFFIN, OHIO — SINCE 1874

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS • BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS

Hartford Detroit Chicago

Speedy Packaging

Engineers at Hinde & Dauch, Union, N.J., developed three styles of corrugated boxes to make packing of oil burners for cross country shipping a matter of minutes. As the burners come off the assembly line, specially engineered die-cut sheets are placed around them, a corrugated shell is put over them and the box is sealed

Greater Plasticizing Capacity

A new heating chamber designed to increase plasticizing capacity on plastics injection molding machines has been announced by the Hydraulic Press Mfg. Co., Mount Gilead, Ohio. It is now standard on all H-P-M 9, 16, 32 and 60-oz plastics injection molding machines.

The chamber lowers heat requirements approximately 100 degrees F, and injection pressures are reduced as much as 3000 psi on the material. Tests in the field have shown a 40 per cent saving in cycle time plus an increase in the speed of color change resulting in easier mold filling.

Three-zone heat control with concentration of high - wattage heaters at the chamber entrance is featured. Heat is applied directly to the spreader, eliminating air gaps and resultant heat loss. At the heart of the new chamber are narrow, high - temperature heating bands with stainless steel clamps for providing contact with the chamber. An improved terminal block, mounted directly on the chamber, eliminates the need for long wire leads.

the A-B-C of M-S-T

A ALWAYS MAKES POSSIBLE
B BETTER PRODUCTS
C AT LOWER COST

Michigan
Electric Resistance
WELDED
STEEL
TUBING

A Quality Product

ROUND
3/8" to 4" O. D. 8 to 22 gauge
SQUARE-RECTANGULAR
½" to 2" O.D. 20 gauge
1" to 2¾", 14, 16, 18 gauge
Carbon 1010 to 1025
Michigan Tubing
has uniform strength, weight, ductility, I. D. and O. D., wall thickness, machinability, and weldability. It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted, and rolled. Available in a wide range of sizes, shapes and wall thicknesses, prefabricated by Michigan or formed and machined in your own plant.

Muffler Inlet Pipe

This is an excellent example of Michigan workmanship in the performance of several intricate fabricating operations to most exacting tolerances.

The pipe manifold end is expanded to 2.225" I. D., a flange superimposed, and a flanged ferrule press-fitted for immediate assembly to exhaust manifold. Two bending operations with minimum reductions permit full flow of gas to hold back-pressure to a minimum. Muffler end diameter of tube is increased by expanding and a bead superimposed to form a "gas-tight" joint.

Michigan engineering and fabrication know-how make for accuracy and economy in the manufacture of this and many other tubular products. Why not consult Michigan about your fabrication problem.

Consult us for engineering and technical help in the selection of tubing best suited to your needs.

Plus Fabricating of our own tubing Michigan is interested ONLY IN THE FABRICATION OF Stainless steel, copper, brass and aluminum tubing.

Michigan ELECTRIC RESISTANCE WELDED STEEL TUBING
THE OLDEST NAME IN STEEL TUBE PRODUCTS CO.

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Device Insures Accuracy

Hard-to-detect and bothersome vibrations are eliminated with new machine

AN OHIO machine tool builder with a machine accuracy problem was planning a major design change when he found that the bothersome vibration was coming through the ground from a nearby railroad yard. Another manufacturer discovered too late that machine vibration was caused by two high teeth on one drive gear.

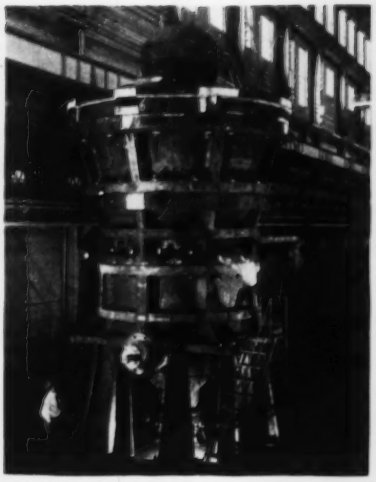
Such vibrations are difficult to detect by ordinary methods. As a result, the International Research & Development Corp., Columbus, O., announces the development of a portable electronic instrument, the Vibraton, which detects and measures vibrations in machinery and jet engines.

Dr. Arthur R. Crawford, president of International Research says that the Vibraton helps meet industry's demand for electronic tools which cut production and maintenance costs by providing a simple method of accurate dynamic balancing. He calls attention to the fact that speeds at which moving parts rotate are increasing tremendously in industry and that these higher speeds have brought difficult vibration problems.

Small and Accurate — Slightly larger than a portable typewriter, the Vibraton has two direct reading meters which give readings of frequency and an amplitude of vibration. Two external components, a pickup and a strob lamp, are plugged in the instrument when in use. The machine operates on standard 110-v power.

Four circuit components plug and interlock for easier servicing. A multiposition switch in the amplitude circuit yields meter reading in full scale from 0.0001 to 0.1 inch peak to peak. A similar switch in the frequency circuit permits dynamic balancing operations from 500 to 160,000 rpm.

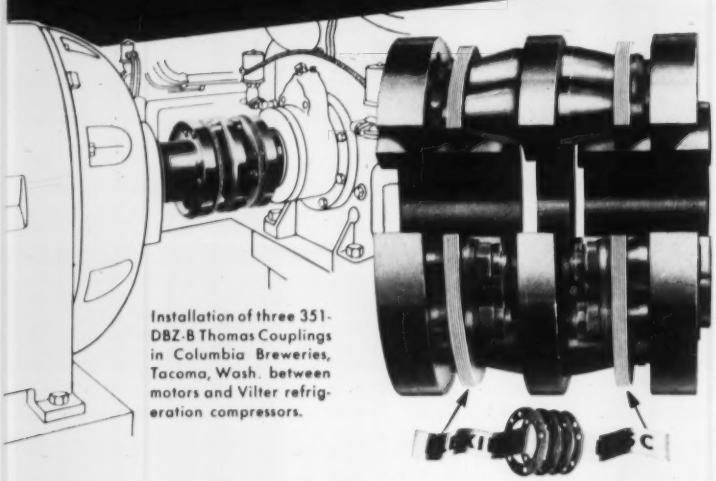
Two main achievements of the Vibraton, according to Dr. Crawford are analysis of vibration problems and dynamic balancing. He adds that a large proportion of bearing failures can be corrected by eliminating excessive vibration.



Crusher Bound for Quarry

This 60-89 Superior Crusher, one of the largest of its kind built by Allis-Chalmers Mfg. Co., is now ready for shipment to lower Michigan for the $15 million Presque Isle Corp. project. Capable of crushing 1800 to 2200 tons per hour, it has an 8 to 9-inch setting and a 1½ in. throw. It is push-button controlled, has 350-hp 720 rpm motor

THOMAS FLEXIBLE COUPLINGS...
for more years of better service!

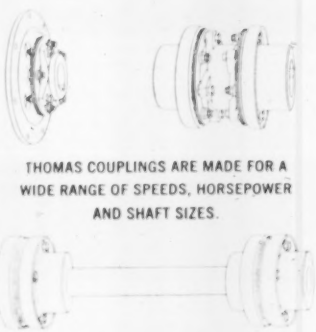


Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



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Largest Exclusive Coupling Manufacturer in the World
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EXACT WHEELS... incredible production SPEEDS

by BAY STATE

by Jones & Lamson

THIS WHEEL Sharpens Tools For This *FAST* PRODUCTION

BRILLIANT RESEARCH, by progressive companies like JONES & LAMSON, has stepped up top metal-turning speeds from the old 200 s.f.m. to 1200 s.f.m. and even more! For such amazing speeds, precision tool-grinding becomes highly critical, demanding perfection in grinding wheel performance.

J & L, for example, finds BAY STATE'S C-80G9-V3, 12" x 1" x 1" wheel the exact one for maximum production, accuracy, and efficiency in grinding the carbide-tipped turning and facing tools for such high speed operations.

The "V3" portion of this specification is an important factor in the superior performance of these BAY STATE wheels. The figure 3 signifies one of those extra sub-divisions of hardness that only BAY STATE offers.

These FRACTIONAL GRADES allow exact grinding wheel specification. Capable BAY STATE engineers are at your service to help you select these pin-pointed specifications as required for your grinding operations.

Just ask for BAY STATE "On-The-Job" Engineering Service.

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WHEELS of PROGRESS

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Put it on the Blanchard...

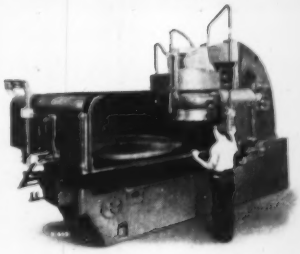
it takes 1/5th the time!

Here is another example of the high production attainable while grinding to extremely close tolerances with Blanchard Surface Grinders and Blanchard Wheels.

It formerly took 45 hours, floor-to-floor, to grind these nine hardened steel machine tool ways. They are 2½" x 3½" x 50" and hardened to Rockwell C-60-63.

Now, these highly desirable results are obtained, using a No. 42-72-84 Blanchard Surface Grinder — nine are placed on the chuck and ground on 6 sides, removing .015" from each surface, parallel to .001", flat within .001" with surface finish of 5 micro-inches. The Blanchard **cut time to 9 hours,** floor-to-floor!

No wonder production men say: "Put it on the Blanchard — it takes less time to do a better job".



This is the largest Blanchard Surface Grinder, No. 42-72-84.

Send for your free copies of "Work Done on the Blanchard", fourth edition, and "Art of Blanchard Surface Grinding".

PUT IT ON THE BLANCHARD

THE BLANCHARD MACHINE COMPANY 64 STATE ST., CAMBRIDGE 39, MASS., U.S.A.

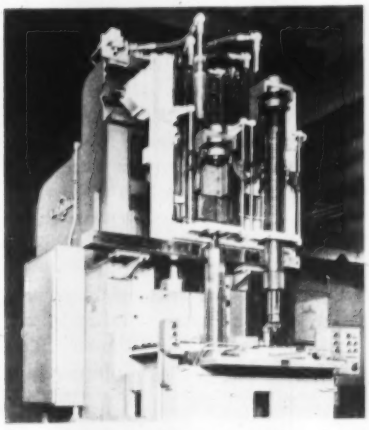
Two-Pass Broaching

BROACHING MACHINE, a 50-ton, 72-inch stroke pull down unit, developed by Colonial Broach Co., Detroit, enables large components requiring two passes to be broached internally from start to finish with minimum handling. It can be used for internal broaching of involute splines, straight splines, squares, rectangles and irregular shapes, etc.

The part to be broached is placed in position on a hydraulically actuated receding table and requires no further handling until completion of automatic cycle. The finished part is then removed and sent along to the next operation.

Both Hands Clear—To start the cutting cycle, the operator must depress buttons at both sides of the machine, guaranteeing that both hands are clear of the machine. The sequence is automatic: Receding fixture brings the part into cutting position; initial pass broach is pulled through part; fixture recedes to clear broach; broach is returned to handling puller at top of machine; dual sliding broach handling support shuttles to the left carrying the second pass (finishing) broach into cutting position.

The second or finishing pass is identical to the initial pass. The sliding broach handling support shuttles to starting position and stops automatically, ready to begin another cycle. While the finished part is being unloaded a new part is loaded. The entire system is electrically controlled.



IN CUTTING POSITION
. . . the sequence is automatic

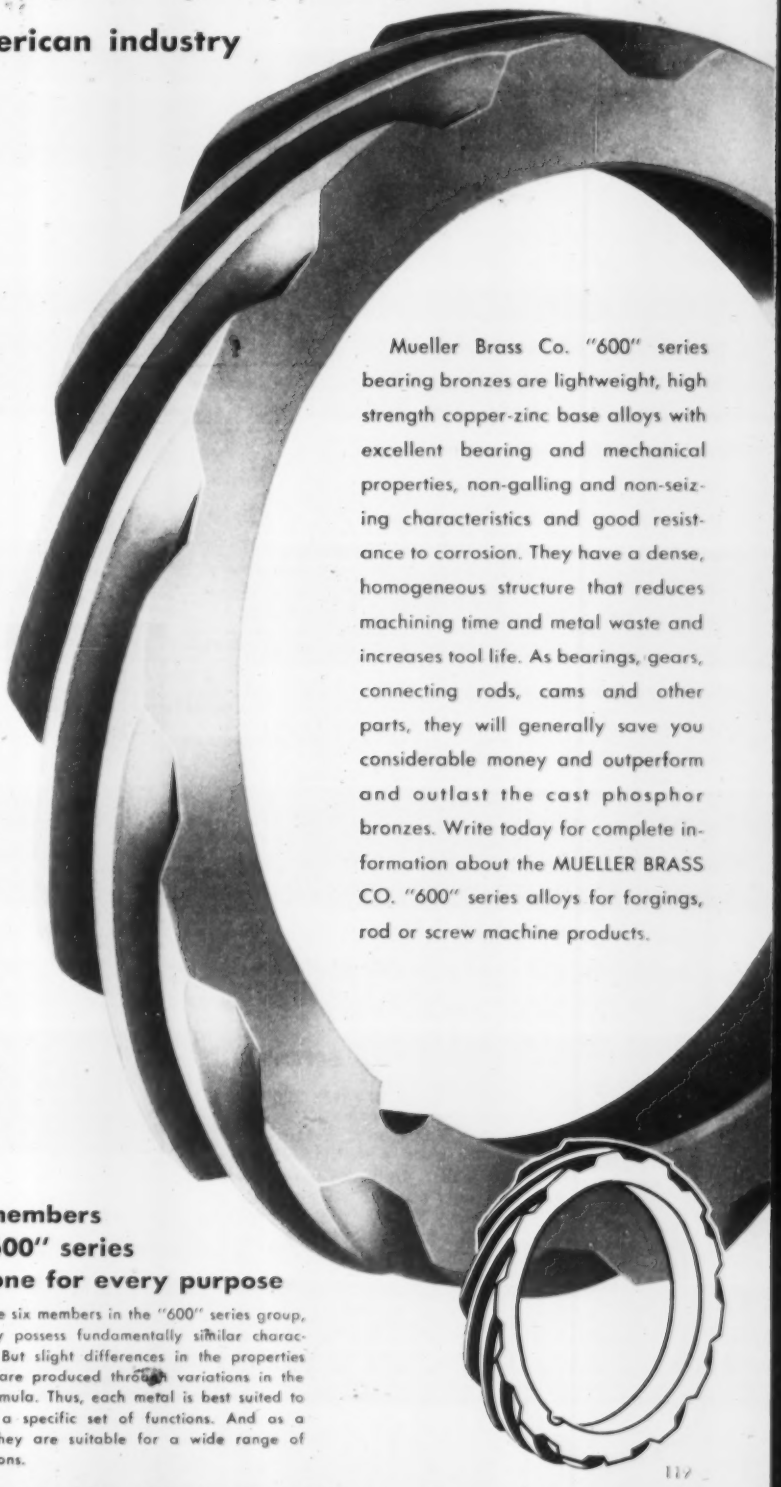
MUELLER BRASS CO.

600 SERIES BEARING ALLOYS

FORGINGS • ROD • SCREW MACHINE PRODUCTS

proving their quality throughout

American industry



Mueller Brass Co. "600" series bearing bronzes are lightweight, high strength copper-zinc base alloys with excellent bearing and mechanical properties, non-galling and non-seizing characteristics and good resistance to corrosion. They have a dense, homogeneous structure that reduces machining time and metal waste and increases tool life. As bearings, gears, connecting rods, cams and other parts, they will generally save you considerable money and outperform and outlast the cast phosphor bronzes. Write today for complete information about the MUELLER BRASS CO. "600" series alloys for forgings, rod or screw machine products.

six members of "600" series . . . one for every purpose

There are six members in the "600" series group, and they possess fundamentally similar characteristics. But slight differences in the properties of each are produced through variations in the basic formula. Thus, each metal is best suited to perform a specific set of functions. And as a group, they are suitable for a wide range of applications.

117

MUELLER BRASS CO. PORT HURON 19, MICHIGAN

highest quality...

to your specifications...

rigidly inspected...

uniform accuracy...

to meet industry's demands ...

CONNECTING ROD BOLTS
AIRCRAFT ENGINE BOLTS
PLACE SELF LOCKING BOLTS
AUTOMOTIVE SPECIAL BOLTS
STAINLESS STEEL BOLTS

Chandler

cold forged cap screws

Absolute control during every phase of production permits us to make the claim... to meet industry's demands. Precision is not just another word with CHANDLER ... it's a way of life. Only the finest steel stock is used, and the most modern machinery operated by skilled technicians is employed to transform this material into the fasteners you require. Send us your prints for quotation or ...*Write today for catalog.*

1685-CH

Specialists in Thread-Rolling after Heat-Treating

PRODUCTS CORPORATION

1488 Chardon Road • Cleveland 17, Ohio

Flexible Shaver

One machine finishes two gears with only three steps required for changeover

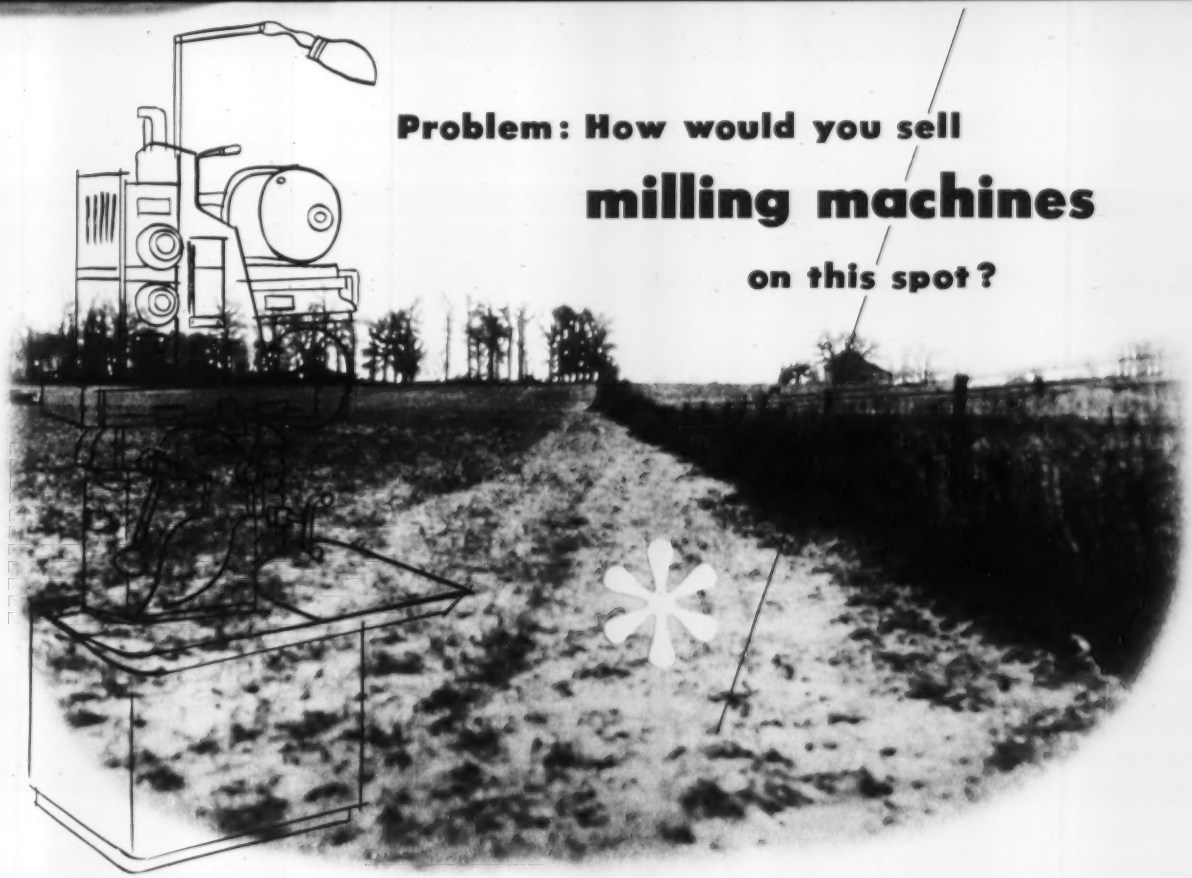
PRODUCTION shaving of a two-gear cluster for farm tractor transmissions poses a machine requirement of high production and flexibility. The same machine is used to finish both gears in the cluster and must be capable of performing the shaving operation to the required accuracy with a minimum time loss for changeover.

A Model 870 underpass gear finisher built by Michigan Tool Co., Detroit, Michigan, attains a production rate of about 240 gears per hour. It is automatically equipped and the only operator attention required is putting parts into the loader. An automatic sizing fixture at the entry end of the loader prevents the loading of oversize parts. The result is faster shaving and more accurate gears.

Three Steps—The machine setup is changed for each shaving operation. Only three steps are required in the changeover: Center distance is changed by means of a handwheel; sizing fixture is changed by removing four bolts; the sub-plate, mounting the head and tailstocks and the loader, is positioned by lining up locating markers.

A cylinder pushes the gear to be shaved into a round carrier with a diameter equal to that of the larger gear. A limit switch, tripped on retraction of the cylinder, causes a second cylinder at the back of the machine to pull the gear into shaving position.

Underpass Cycle — An arbor moves into position and holds the gear for the shaving operation. Movement of the arbor into position cause a limit switch to be tripped, starting the underpass shaving cycle. At the end of the shaving cycle another limit switch is tripped causing the arbor to retract and the gear carrier to return to loading position. The next gear being moved into shaving position pushes the finished gear onto a chain conveyor which carries it to a stock tray or to another conveyor.



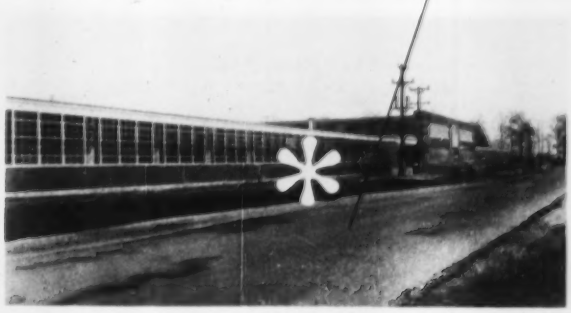
Problem: How would you sell

milling machines

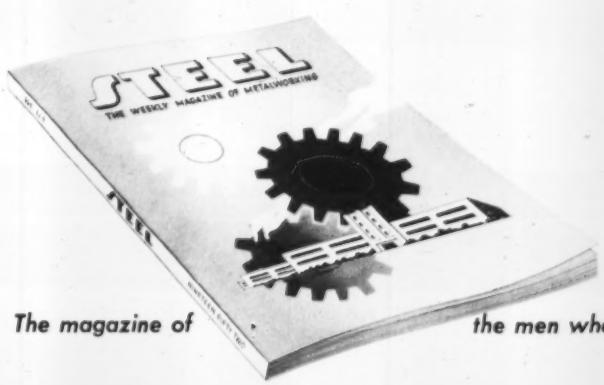
on this spot?

Not even a genius could sell milling machines in this weed-grown field! But that was a short time ago. Today, on this same spot, the spanking new plant shown below is turning out metalworking products in volume. Multiply this "quick change" by hundreds and you get some idea of what's happening throughout Metalworking America. Every week new plants are springing up and *an entirely new market* is being created for your products and services. That's why men sensitive to new market possibilities are raising their sales goals aimed at Metalworking. That's why STEEL is carrying more advertising pages today than ever before. For STEEL . . . through its continuing census of Metalworking . . . is the *only* publication which has succeeded in matching its circulation with Metalworking's rapid growth. If you want to stake out a bigger claim in this dynamic market, talk to the man from STEEL.

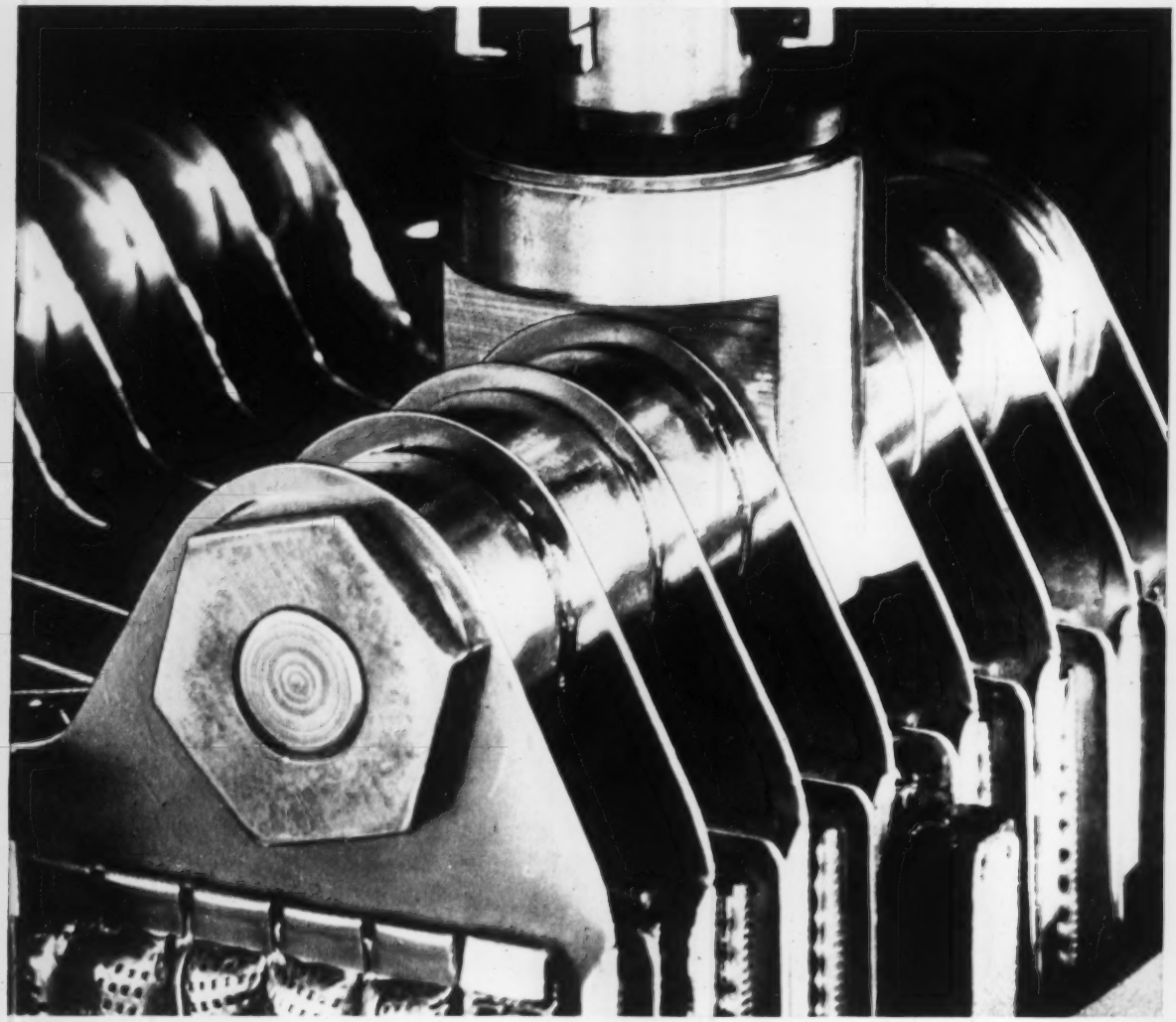
STEEL • Penton Building • Cleveland 13, Ohio



FRAM Corporation's new plant in Greenville, Ohio



The magazine of the men who manage, operate and buy for the Metalworking industry



The inside story on industrial truck battery costs

You are looking at the interior of one of America's most unusual batteries! It is unusual because the cells themselves are made of steel . . . not just the "steel tray" assemblies. Result: the strongest battery construction available for industrial truck use today.

Furthermore, the electrolyte used in EDISON batteries is alkaline—a natural preservative of steel. In daily use, these battery features mean that EDISONS are electrically foolproof—not harmed by such accidents as over-charging, short circuiting, etc. That's why, in hundreds of truck operations, EDISONS give *more than twice* the performance life of conventional batteries.

Such profitable EDISON features add up to one important conclusion: most dependable power at lowest over-all cost.

Personally evaluate these facts. Request a visit from the Edison Field Engineer in your area. Write Edison Storage Battery Division, Thomas A. Edison, Incorporated, West Orange, New Jersey.

Most dependable power . . .
lowest over-all cost
you get both with an EDISON

EDISON

Nickel • Iron • Alkaline
STORAGE BATTERIES

EDISON ALSO MAKES THE FAMOUS "V.P." VOICEWRITER AND THE TELEVOICE SYSTEM

Market Outlook

STEEL INGOT production continues to ebb slightly, but if the present rate of operations can be maintained, 1954 output will be exceeded by only three other years. They are the war-stimulated years of 1950, 1951 and 1953.

INTERESTING FIGURES— In the month which ended yesterday—January—ingot output totaled approximately 7.8 million net tons. At that rate, a year's output would be 94 million tons. January was not one of the best months either. It was lower than the preceding one, which also was slow in comparison with the pace of earlier 1953, the December output being 7,937,000 tons. In fact, a monthly figure as low as 7.8 million tons has not been recorded since the strike-ridden month of July, 1952.

SLOWER—Nearly all of January saw a slowly declining rate of ingot production, the week ended Jan. 31 being the third consecutive one in which the pace eased off. National rate that week was 73 per cent of capacity. That's a 1-point reduction from the preceding week.

REVISED OPINIONS— Now that February is here, there is less confidence than there was that the country's rate of steel finishing will be better than the January pace. There has been a slight pickup in some sectors of the market, but some steelmen believe they are not sufficient to offset carry-overs and deferments from last quarter, which helped to bolster January schedules.

One area in which some business improvements are appearing is the foundry industry, about the first to feel the present business decline. Jobbing foundries slowed down early last year. However, the improvement is not industry-wide. Some of the captive foundries which did not feel as sharp a jolt as the jobbing shops are just now noticing a slackening as their parent companies' business shrinks.

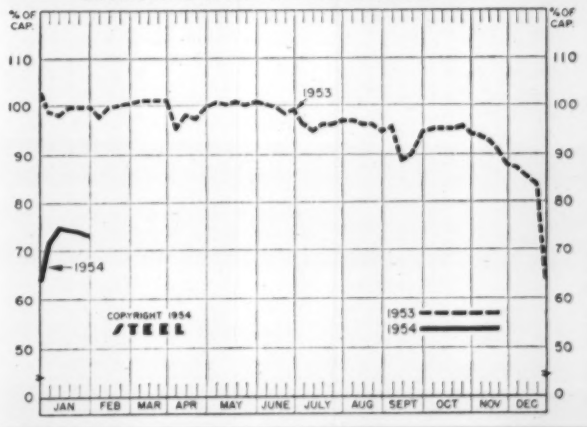
BRIGHTER— Another spot where some improvement is noticed is the agricultural implement industry. Several plants are returning men to work.

Although some observers are a little less optimistic than they were for the first quarter's steel business, Benjamin F. Fairless, chairman, U. S. Steel Corp., thinks his company, biggest of them all, will have an ingot production rate of around 80 per cent in the first half of this year. Although he does not expect 1954 to be as good as last year he does say this year will be a good one.

NO LOAFING—Now that the steel industry has more time on its hands it is not sitting on them. Allegheny Ludlum Steel Corp., Pittsburgh, is bringing out new products and exploring new markets to strengthen its market position. One of them is a new grade of stainless steel which is suitable for structural use and which does not depend upon cold rolling to develop its ultimate tensile strength. Youngstown Sheet & Tube Co. is starting to rebuild and enlarge the blooming mill at its Brier Hill Works, Youngstown.

CONCESSIONS SOUGHT— The reduced demand for steel is not only spurring mills to absorb some of the charges for delivering steel to customers but it is bringing pressure to reduce or waive some of the extras. Base prices are remaining firm, however, and as a result, STEEL's price composite on finished steel is unchanged at $113.91 a net ton.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged at leading production points)

	Week Ended Jan. 31	Change	Same Week 1953	Same Week 1952
Pittsburgh	83	— 0.5*	106.5	99
Chicago	80	— 1*	100.5	102.5
Mid-Atlantic	81	— 1	95	99
Youngstown	70	0	106	106
Wheeling	73	— 8	101	80
Cleveland	82.5	— 0.5*	97	99.5
Buffalo	71	0	106	104
Birmingham	87	0	96	104
New England	55	— 5	95	87
Cincinnati	71.5	+ 2	95.5	103
St. Louis	48	—17	101	86.5
Detroit	83.5	— 5.5	101.5	105
Western	79	— 1	107	95.5
Estimated National Rate	73	— 1	99.5	99.5

*Change from preceding week's revised rate.

Weekly steelmaking capacity is estimated at 2,384,549 net tons in 1954; 2,254,459 tons in 1953; 2,077,040 tons in 1952.

The Metalworking Outlook—p. 37 Technical Outlook—p. 87

PRICE INDEXES AND COMPOSITES

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics) Week Ended Jan. 26

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.400	Bars, H.R., alloy	$8.675	Strip, C.R., stainless, 430 (lb)	$0.415	Tin plate, hot-dipped, 1.25 lb	$8.433
Rails, light, 40 lb	5.767	Bars, H.R., stainless, 303 (lb)	0.418	Strip, H.R., carbon	4.975	Tin plate, electrolytic, 0.25 lb	7.133
Tie Plates	5.125	Bars, H.R., carbon	4.873	Pipe, black, buttweld (100 ft)	14.454	Black plate, can making quality	6.233
Axles, railway	7.250	Bars, reinforcing	4.863	Pipe, galv., buttweld (100 ft)	17.567	Wire, drawn, carbon	7.713
Wheels, freight car, 33 in. (per wheel)	47.000	Bars, C.F., carbon	7.860	Pipe, line (100 ft)	141.960	Wire, drawn, stainless, 430 (lb)	0.545
Plates, carbon	4.550	Bars, C.F., alloy	11.075	Casing, oil well, carbon (100 ft)	149.516	Bale ties (bundle)	5.663
Structural Shapes	4.383	Bars, C.F., stainless, 302 (lb)	0.433	Casing, oil well, alloy (100 ft)	214.113	Nails, wire, 8d common	7.488
Bars, tool steel, carbon (lb)	0.415	Sheets, H.R., carbon	4.765	Tubes, boiler (100 ft)	‡	Wire, barbed (80-rod spool)	6.799
Bars, tool steel, alloy, oil hardening die (lb)	0.505	Sheets, C.R., carbon	5.904	Tubing, mechanical, carbon (100 ft)	‡	Woven wire fence (20-rod roll)	16.065
Bars, tool steel, H.R. alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.075	Sheets, galvanized	6.945	Tubing, mechanical, stainless, 304 (100 ft)	161.193		
Bars, tool steel, H.R., alloy, high speed W 18, Cr 4, V 1 (lb)	1.550	Sheets, C.R., stainless, 302 (lb)	0.548				
		Sheets, electrical	9.000				
		Strip, C.R., carbon	7.243				

‡Not available.

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Jan. 26 1954	Jan. 19 1954	Month Ago	Jan. Average
(1947-1949=100)	141.3	141.3	141.5	141.4

STEEL's FINISHED STEEL PRICE INDEX

	Jan. 28 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	189.74	189.74	189.74	181.31	151.85
Index in cents per lb	5.140	5.140	5.140	4.912	4.114

STEEL's ARITHMETICAL PRICE COMPOSITE*

	Jan. 28 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Finished Steel, NT	$113.91	$113.91	$114.64	$110.98	$97.77
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	55.04	46.69
Basic Pig Iron, GT	56.04	56.04	56.04	54.66	46.22
Malleable Pig Iron, GT	57.27	57.27	57.27	55.77	47.41
Steelmaking Scrap, GT	28.17	29.17	31.33	43.00	40.33

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

COMPARISON OF PRICES

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Jan. 28 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.15	4.15	4.15	3.95	3.45
Bars, H.R., Chicago	4.15	4.15	4.15	3.95	3.35
Bars, H.R., del. Philadelphia	5.302	5.302	5.302	4.502	3.816
Bars, C.F., Pittsburgh	5.20	5.20	5.20	4.925	3.95
Shapes, Std., Pittsburgh	4.10	4.10	4.10	3.85	3.275
Shapes, Std., Chicago	4.10	4.10	4.10	3.85	3.25
Shapes, deld., Philadelphia	4.38	4.38	4.38	4.13	3.492
Plates, Pittsburgh	4.10	4.10	4.10	3.90	3.50
Plates, Chicago	4.10	4.10	4.10	3.90	3.40
Plates, Coatesville, Pa.	4.35	4.35	4.35	4.35	3.75
Plates, Sparrows Point, Md.	4.10	4.10	4.10	3.90	3.45
Plates, Claymont, Del.	4.55	4.55	4.55	4.35	3.95
Sheets, H.R., Pittsburgh	3.925	3.925	3.925	3.775	3.275
Sheets, H.R., Chicago	3.925	3.925	3.925	3.775	3.25
Sheets, C.R., Pittsburgh	4.775	4.775	4.775	4.575	4.00
Sheets, C.R., Chicago	4.775	4.775	4.775	4.575	4.00
Sheets, C.R., Detroit	4.975	4.975	4.975	4.775	4.20
Sheets, Galv., Pittsburgh	5.275	5.275	5.275	5.075	4.40
Strip, H.R., Pitts.	4.425	4.425	4.425	3.75-4.225	3.275
Strip, H.R., Chicago	3.925	3.925	3.925	3.725	3.25
Strip, C.R., Pittsburgh	5.45	5.45	5.45	5.10-5.80	4.375
Strip, C.R., Chicago	5.70	5.70	5.70	5.35	4.00
Strip, C.R., Detroit	5.45-6.05	5.45-6.05	5.45-6.05	5.30-6.05	4.20
Wire, Basic, Pitts.	5.525	5.525	5.525	5.475-5.225	4.325
Nails, Wire, Pittsburgh	6.55	6.55	6.55	6.35	5.775
Tin plate (1.50 lb), box, Pitts.	$8.95	$8.95	$8.95	$8.95	$6.70

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$75.50	$75.50	$75.50	$70.50	$61.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$", Pitts.	4.525	4.525	4.525	4.425	3.775

PIG IRON, Gross Ton	Jan. 28 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$57.00	$57.00	$57.00	$55.50	$47.00
Basic, Valley	56.00	56.00	56.00	54.50	46.00
Basic, deld. Phila.	59.66	59.66‡	59.66‡	59.25	50.30
No. 2 Fdry, Pitts.	56.50	56.50	56.50	55.00	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	55.00	46.25
No. 2 Fdry, Valley	56.50	56.50	56.50	55.00	46.50
No. 2 Fdry, deld. Phila.	60.16	60.16‡	60.16‡	59.75	50.80
No. 2 Fdry, Birm.	52.88	52.88	52.88	51.38	43.38
No. 2 Fdry (Birm.) del. Cin.	60.43	60.43	60.43	58.93	49.43
Malleable, Valley	56.50	56.50	56.50	55.00	46.50
Malleable, Chicago	56.50	56.50	56.50	55.00	46.50
Ferromanganese, Duquesne	200.00†	200.00†	200.00†	228.00*	163.00*

*78-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton. ‡Revised

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$30.50	$30.50	$32.50	$44.00	$41.00
No. 1 Heavy Melt, E. Pa.	27.00	28.00	29.50	41.50	42.00
No. 1 Heavy Melt, Chicago	27.00	29.00	30.50	42.50	39.00
No. 1 Heavy Melt, Valley	29.50	29.50	29.50	44.00	37.75
No. 1 Heavy Melt, Cleve.	28.50	28.50	28.50	43.00	37.25
No. 1 Heavy Melt, Buffalo	25.00	25.00	28.50	43.00	44.00
Rails, Rerolling, Chicago	38.00	38.00	42.50	52.50	56.00
No. 1 Cast, Chicago	32.50	32.50	32.50	43.00	47.50

COKE, Net Ton

Beehive, Furn, Connisvl.	$14.75	$14.75	$14.75	$14.75	$14.50
Beehive, Fdry, Connisvl.	16.75	16.75	16.75	17.00	17.00
Oven Fdry, Chicago	24.50	24.50	24.50	24.50	20.40

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 21.50, pigs 20.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 23.30; No. 43, 5% Si, 23.10; No. 142, 4% Cu, 24.40; No. 195, 4.5% Cu, 0.8% Si, 23.70; No. 214, 3.8% Mg, 24.40; No. 356, 7% Si, 0.3% Mg, 23.20.

Antimony: R.M.M. brand, 99.5% 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Texas, in bulk. Foreign brands, 99.5%, 25.50-26.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $2.00 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg, $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 29.50-30.00 deld. Conn. Valley, 29.625-30.125 deld. Midwest; Lake 30.00 deld; Fire refined 29.75 deld.

Germanium: 99.9%, $295 per lb nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $165-$175 per troy oz.

Lead: Common 12.80, chemical 12.90, corroding 12.90, St. Louis, New York basis, add 0.20.

Lithium: 98%, $11-$14 per lb, depending on quantity.

Magnesium: 99.8% standard ingots 27.00, 10,000 lb or more, f.o.b. Freeport, Tex. Sticks, 1.3 in. dia., 46c, 100 to 4000 lb.

Magnesium Alloys: AZ91B 30.50; AZ91C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more.

DAILY NONFERROUS PRICE RECORD

	Price Jan. 28	Change	Previous Price	Dec. Avg.	Nov. Avg.	Jan. 1953 Avg.
Copper	29.50-30.00	Oct. 20	29.00-30.00	29.750	29.750	24.500
Lead	12.80	Jan. 18	13.30	13.300	13.300	13.925
Zinc	9.50	Jan. 18	10.00	10.000	10.000	12.500
Tin	85.25	Jan. 27	85.00	84.913	83.352	121.500
Nickel	60.00	Jan. 14	56.50	60.000	60.000	56.500
Aluminum	21.50	July 15	20.50	21.500	21.500	20.000
Magnesium	27.00	Mar. 9	24.50	27.000	27.000	24.500

Quotations in cents per pound based on: Copper, deld. Conn. Valley; Lead, common grade, deld. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, deld. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99+%, deld.; Magnesium 99.8%, Freeport, Tex.

Mercury: Open market, spot, New York, $188-$191 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3.40 per lb; pressed ingot $4.06 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 60.00; 25-lb pigs 62.65; "XX" nickel shot 63.65; "F" nickel shot or ingots for addition to cast iron, 60.00; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $140-$150 per troy oz nom.

Palladium: $22-$24 per troy oz.

Platinum: $91-$93 per troy oz. from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $125 per troy oz.

Ruthenium: $75-$80 per troy oz.

Selenium: 99.5%, $5-$6 per lb.

Sodium: 16.50, carlots; 17.00 l.c.l.

Tantalum: Sheet, rod $39.00 per lb; powder $33.50 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, New York, 85.25.

Titanium: Sponge, 99.3+ %, $5 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000 lb lots $5.35 per lb f.o.b. shipping point; less than 1000 lb $5.50; 99+% hydrogen reduced, $5.85. Treated ingots $7.95.

Zinc: Prime western 9.50, brass special 9.75, intermediate 10.00, E. St. Louis, freight allowed over 0.50 per pound. High grade 10.85, special high grade 11.00, die casting alloy ingot 14.00, deld.

Zirconium: Sponge $14.00 per lb; powder 100 lb or more $7.00; less than 100 lb $8.00. (Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston Alloys 19.50-20.50; No. 12 foundry alloy (No. 2 grade) 18.50-19.50; 5% silicon alloy, 0.60 Cu max., 21.75-22.75; 13 alloy, 0.60 Cu max., 21.75-22.75; 195 alloy 20.75-21.25; 108 alloy 19.75-20.25; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 20.25-21.00; grade 2, 19.00-19.75; grade 3, 18.25-19.00; grade 4, 16.50-17.50.

Brass Ingot: Red brass, No. 115,24.50; tin bronze No. 225, 35.25, No. 245, 29.50; high-leaded tin bronze, No. 305, 28.75; No. 1 yellow, No. 405, 20.75; manganese bronze No. 421, 25.25.

Magnesium Alloy Ingot: AZ63A, 31.50; AZ91B, 31.50; AZ91C, 32.00; AZ92A, 31.50.

NONFERROUS MILL PRODUCTS

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 35.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weatherproof, 100,000 lb, 36.28; 30,000 lb, 36.53; l.c.l., 37.03. Magnet wire deld., 15,000 lb or more 41.83; l.c.l., 42.58.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more $18.00 per cwt; pipe, full coils $18.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 100,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forging billets, $6; hot-rolled and forged bars, $6.

ZINC

Sheets 23.00, f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 19.50-20.50, f.o.b. mill, 36,000 lb and over. Plates 19.00-22.25.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R.	86.5	67.5	92.5
Strip, C.R.	92.5	70.5	98.5
Plate, H.R.	84.5	66.5	90.5
Rod, Shapes	82.5	65.5	88.5
Seamless Tubes	115.5	100.5	137.5
Shot, Blocks	....	60.0	....

ALUMINUM

(30,000 lb base; freight allowed over 499 lb)
Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Inc.	Flat Sheet*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	12-48	33.9	...	...
0.135-0.096	12-48	34.4	...	...
0.095-0.077	12-48	35.1	32.7	37.5
0.076-0.061	12-48	35.7	32.9	37.7
0.060-0.048	12-48	36.1	33.2	38.1
0.047-0.038	12-48	36.6	33.6	38.4
0.037-0.030	12-48	37.0	34.0	39.1
0.029-0.024	12-48	37.6	34.3	39.6
0.023-0.019	12-36	38.3	35.1	40.4
0.018-0.017	12-36	39.1	35.7	41.3
0.016-0.015	12-36	40.0	36.5	42.5
0.014	12-24	41.0	37.5	43.8
0.013-0.012	12-24	42.1	38.2	44.8
0.011	12-24	43.1	39.4	46.4
0.010-0.0095	12-24	44.3	40.5	48.0
0.009-0.0085	12-24	45.6	41.9	50.0
0.008-0.0075	12-24	47.1	43.1	51.8
0.007	12-18	48.6	44.6	54.1
0.006	12-18	50.2	46.0	59.1

* 72-180 in. lengths. † 26 in. max. dia.

ALUMINUM

Plates and Circles: Thickness 0.250-3.0 in., 24-60 in. widths or dia., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
2S-F, 3S-F	32.4	36.3
50S-F	33.5	37.4
4S-F	34.5	39.1
52S-F	36.2	40.9
61S-T6	37.4	41.5
24S-T4*	39.3	45.4
75S-T6*	47.1	53.7

* 24-48 in. widths or dia., 72-180 in. lengths.

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or across flats	Round 11S-T3	Round 17S-T4	Hexagonal 11S-T3	Hexagonal 17S-T4
Drawn				
0.125	50.6	57.9	...	...
0.156-0.172	50.6	48.9	...	...
0.188	50.6	48.9	...	62.4
0.219-0.234	47.9	46.2	...	...
0.250-0.281	47.9	46.2	...	59.5
0.313	47.9	46.2	...	56.8
Cold-finished				
0.375-0.531	46.6	44.9	56.2	53.4
0.563-0.688	46.6	44.9	53.4	50.2
0.750-1.000	45.5	43.8	48.9	47.3
1.063	45.5	43.8	...	45.7
1.125-1.500	43.8	42.1	47.3	45.7
Rolled				
1.563	42.7	41.0	...	...
1.625-2.000	42.1	40.4	...	44.1
2.125-2.500	41.1	39.4	...	...
2.750-3.375	39.9	38.2	...	...

ALUMINUM

Forging Stock: Round, Class 1, 43.8-34.4, in specific lengths 36-144 in., diameters 0.375-8 in.; rectangles and squares, Class 1, 50.2-38.4 in random lengths 0.375-4.0 in. thick, widths 0.750-10.0 in.

Pipe: A.S.A. Schedule 40, alloy 63S-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft.

Nom. pipe size, in.		Nom. pipe size, in.	
¼	$15.05	2	$ 46.30
1	23.65	4	127.70
1¼	32.00	6	228.50
1½	38.25	8	343.80

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 108.00, 0.064-in. 81.00, 0.125-in. 71.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot-rolled, AZ31, 53.00, 20,000 lb or more 0.188-1.0 in. thick, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 69.00, 20,000 lb or more, ¼-in. thick, widths 24-48 in., lengths 60-144 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in. 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ¼-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.38b	45.98c	....	48.44	26.000	26.000	25.250
Yellow Brass	41.72	41.66	42.26	44.63	19.750	19.500	18.000
Red Brass, 85%	45.44	45.38	45.98	48.25	23.000	22.750	22.250
Low Brass, 80%	44.47	44.41	45.01	47.28	22.125	21.875	21.375
Naval Brass	45.76	40.07	52.80	48.92	18.250	18.000	17.500
Commercial Bronze, 90%	46.95	46.89	47.49	49.51	23.875	23.625	23.125
Nickel Silver, 10%	55.36	59.43g	57.69	....	23.625	23.375	11.813
Phosphor Bronze, A, 5%	66.58	67.08	67.08	68.23	26.125	25.875	24.875
Silicon Bronze	52.71	51.96	52.75	70.11e	26.125	24.875	24.125
Manganese Bronze	49.48	43.62	54.06	....	18.250	18,000	17.500
Muntz Metal	43.96	39.77	....	....	18.625	18.375	17.875

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 2S clipping 11.00; low copper clippings 11.00; mixed clippings 9.00-10.00; old sheet 8.00-9.00; borings and turnings 5.50; pistons and struts 5.50; crankcases 8.00-9.00; industrial castings 8.00-9.00.

Copper and Brass: Heavy copper and wire, No. 1 22.00; No. 2 copper 20.00; light copper 18.00; No. 1 composition red brass 15.50-16.00; No. 1 composition turnings 14.75-15.25; mixed brass turnings 9.50-10.00; new brass clippings 13.50-16.00; No. 1 brass rod turnings 10.50-11.00; light brass 8.50-9.00; heavy yellow brass 11.00-11.50; new brass rod ends 13.00; auto radiators, unsweated, 11.00-11.50; cocks and faucets 13.00-13.50; brass pipe 14.50-15.00.

Lead: Heavy 9.50; battery plate 5.00-5.50; linotype and stereotype 12.00; electrotype 10.50; mixed babbitt 11.00-11.50.

Magnesium: Clippings 20.00-21.00; clean castings 19.00-20.00; iron castings, not over 10% removable Fe, 18.00-19.00.

Monel: Clippings 22.00-24.00; old sheet 20.00-22.00; turnings 14.00-16.00; rods 23.00-24.00.

Nickel: Sheets and clips 60.00-65.00; rolled anodes 60.00-65.00; turnings 40.00; rod ends 60.00-65.00.

Tin: No. 1 pewter 40.00-45.00; block tin pipe 65.00-67.00; No. 1 babbitt 37.00-38.00.

Zinc: Old zinc, 3.25; new die cast scrap, 3.00; old die cast scrap, 3.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 2S, 3S clippings 13.00-13.50; 51S, 52S clippings 13.00-13.50; 14S, 17S, 24S clippings 11.50-12.25; mixed clippings 11.50-12.00; old sheet 10.00-11.00; old cast 10.00-11.00; clean old cable, free of steel 13.00-13.50; borings and turnings 10.50-11.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.

Copper, Brass: No. 1 copper 23.00-23.50; No. 2 copper 21.50; light copper 20.00; refinery brass (60% copper) per dry copper content 19.00; auto radiators, 13.75, nominal.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 23.00-23.50; No. 2 copper 21.00-21.50; light copper 19.50-20.00; No. 1 composition borings 17.00; No. 1 composition solids 17.50; heavy yellow brass solids 13.50; yellow brass turnings 12.50; radiators 13.50.

PLATING MATERIALS

(F.o.b. shipping points, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $3.15 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 2000-5000 lb; electrodeposited 39.78, cast 42.04, 5000-10,000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb $1.035; 200-499 lb $1.02; 500-999 lb $1.015; 1000 lb or more $1.01.

Zinc: Bar 18.50, bar or flat top 17.50, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.

Chromic Acid: Less than 2000 lb 29.00; over 2000 lb 28.75.

Copper Cyanide: Under 1000 lb 63.90, 1000 lb and over 61.90.

Copper Sulphate: 100-5000 lb 11.35; 5000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,000 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.50; 2500 oz and over 77.375.

Sodium Cyanide: Egg, under 1000 lb 19.80, 1000-19,900 lb 18.80, 20,000 lb and over 17.80, granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb 67.2; 100-500 lb 53.2; 500-1900 lb 50.7; 2000-9900 lb 49; 10,000 lb or more 47.8.

Stannous Chloride (Anhydrous): Less than 50 lb $1.521; 50 lb $1.181; 100-300 lb $1.031; 400-900 lb $1.007; 100-1900 lb 98.2; 2000-4900 lb 94.6; 5000-19,000 lb 88.5; 20,000 lb and over 82.4.

Stannous Sulphate: Less than 50 lb $1.223; 50 lb 92.3; 100-1900 lb 90.3; 2000 lb and over 88.3.

Zinc Cyanide: Under 1000 lb 54.30, 1000 lb and over 52.30.

Nonferrous Metals

Copper shows signs of price weakness. Brokers sell nearby futures at 28 cents and below, custom smelters cut buying prices and mine production is reduced

STORM WARNINGS are flying higher in the copper market.

They could signal the beginning of the end for the remarkably long sustained price strength. For ten months the red metal has managed to stay on even keel. Here are some danger signs that could help upset it:

Discounts — Brokers are selling nearby future metal at 28 cents and below. There's opinion in the trade that if more industrial buyers had bought futures instead of following a month-to-month pattern, copper slump would have been here some time ago.

Scrap Buying—Custom smelters are always sensitive to price trends three months away as it takes about that time to get metal back to market in usable form. They've cut buying prices to a level which translates into a refined price of 26.00-26.50 cents in April.

Mine Cutbacks—The nation's two biggest domestic producers have curtailed mine production in the Southwest. Kennecott Copper Corp. will reduce output by 1400 tons monthly, about 4 per cent of total production, by reducing the work week from 48 to 40 hours at its Chino mine in New Mexico and Ray Copper mine in Arizona. Kennecott also will cut work week to 40 hours at its Utah copper and Nevada mines divisions on Feb. 14. The reductions amount to 14 per cent of the division output. Cutback is ascribed to "reduced demand for copper." Phelps Dodge Corp. will slow operations at its Morenci and Ajo open pit mines in Arizona by about 1100 tons monthly, or 5 to 6 per cent of total company output.

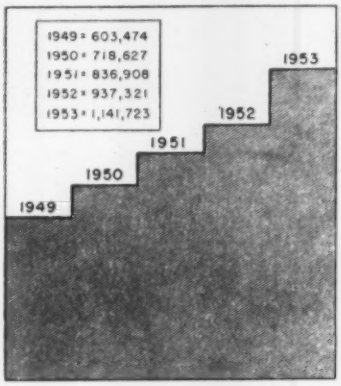
Exports Throttled—Less copper scrap is slated for shipment overseas. For all practical purposes exporters are out of the market because of a shortage of dollars. On Jan. 4, Italy, Germany and Japan clamped down on import licenses, bringing buying to a virtual standstill. Orders booked before that date are still being filled though.

Halfway in Chile—Deal with Chile to get her copper back on world markets is about halfway accomplished. Chile agreed to revise exchange for American copper companies to 110 pesos to a dollar and tax them on basis of earnings. New tax on profits is 75 per cent, but it is a better deal than had been in effect.

Imports Seek Markets—Domestic mines and smelters in the last two months could have supplied all U. S. fabricators' needs. Still, sizable tonnages of copper are coming in and will continue to do so. An import duty of 2 cents a pound will be reinstated June 30 of this year unless domestic price drops below 24 cents before that time.

ALUMINUM STEPS UP

(U. S. Primary Production—Net Tons)



Source: Aluminum Association

Consumption Down—December use of refined copper by brass and wire mills and foundries was lowest in 17 months. The December total of 83,652 tons brought 1953 consumption to 1,375,869 tons, 3582 tons below 1952. Fabricators' bookings of new orders in December called for 89,522 tons of refined copper, bringing 1953 bookings to 1,271,178 tons, 92,857 tons below 1952 total. Producers' 1953 sales to fabricators (1,381,688 tons) were 21,643 tons less than in 1952. Fabricators' stocks entering January amounted to 380,881 tons of refined copper, a hefty increase of 30,077 tons being added in December for year-end tax purposes. Subtracting working stocks from gross reserves and balancing this net reserve against booked orders, fabricators would be theoretically short of about 75,000 tons of copper entering the new year. Twelve months before, that "theoretical shortage" was 200,000 tons.

Gloom for Ingot Makers

Ingot makers had their worst year since 1949 last year, and 1954 business to date doesn't look much better. Average monthly shipments during 1953 were 22,604 tons, according to the defense council of the ingot brass & bronze industry. In 1952 they averaged 23,145 tons.

Aluminum Orders Brighten

Aluminum orders are picking up, but customers must be sold and not just taken for granted, say salesmen. One market man notes that "March business will be good, but February stands to be lousy" on basis of present bookings. Delivery dates on extrusion and tube currently run about 6 weeks, sheet items about 4 weeks and standard ingot alloys a week or less. Export scrap market is very active on clippings, pots and pans, crankcases. Japan is the big buyer.

Imports: Tough Competition

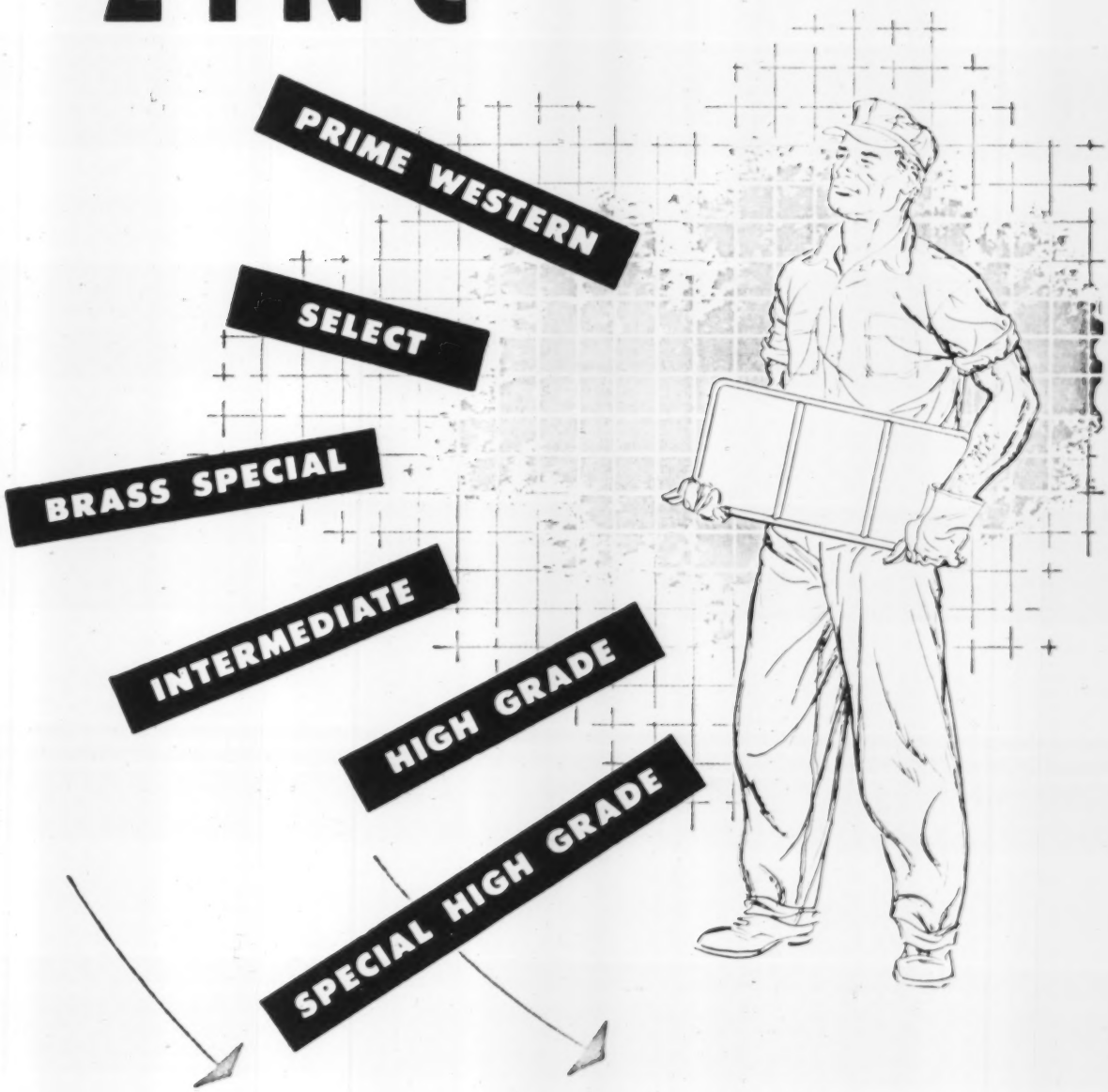
Import competition is tough to beat in brass mill products. Brass screw machine stock is the volume item, at sizable discounts. Import shipments of plumbing copper tube are rising. Brass tube is currently offered in the East at 15 to 18 cents below U. S. prices. One solicitation letter asks fabricators to buy 11,000-pound quantities, paying 25 per cent down and the balance sight draft. By so doing they will be given 7.5 per cent off U. S. producers' best price. Comments one sales manager: "That's their published terms; on negotiated deals a much better deal is offered."

Refining: A Bottleneck?

Are mine developments and metals needs outpacing technology of refining? In two vital metals there's considerable affirmative opinion—titanium and nickel. Defense planners want 10 to 15 times as much titanium as is presently being produced, but a continuous refining process to replace the Kroll batch-type process has yet to be proved feasible. In nickel, a half-dozen or more processes are being explored, but none has yet demonstrated its economic superiority to present methods.

SLAB ZINC

every grade of ZINC for urgent military and civilian requirements



AMERICAN ZINC SALES COMPANY

Distributors for

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, O Chicago St. Louis New York

STEEL PRICES

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on page 149. Key to footnotes, page 151.

—SEMIFINISHED—

INGOTS, Carbon Forging (NT)
Fontana,Calif. K1 ....$86.00
Munhall,Pa. U5 .....59.00

INGOTS, Alloy (NT)
Detroit R7 .....$63.00
Fontana, Calif. K1 ....88.00
Midland,Pa. C18 .....62.00
Munhall,Pa. U5 .....62.00

BILLETS, BLOOMS & SLABS
Carbon Rerolling (NT)
Aliquippa,Pa. J5 ....$62.00
Bessemer,Pa. U5 .....62.00
Clairton,Pa. U5 .....62.00
Ensley,Ala. T2 .....62.00
Fairfield,Ala. T2 .....62.00
Fontana,Calif. K1 ....70.00
Gary,Ind. U5 .....62.00
Johnstown,Pa. B2 ....62.00
Lackawanna,N.Y. B2..62.00
Munhall,Pa. U5 .....62.00
So.Chicago,Ill. U5 ....62.00
So.Duquesne,Pa. U5 ..62.00

Carbon, Forging (NT)
Aliquippa,Pa. J5 ....$75.50
Bessemer,Pa. U5 .....75.50
Buffalo R2 .....75.50
Canton,O. R2 .....75.50
Clairton,Pa. U5 .....75.50
Cleveland R2 .....75.50
Conshohocken,Pa. A3..82.50
Detroit R7 .....78.50
Ensley,Ala. T2 .....75.50
Fairfield,Ala. T2 .....75.50
Fontana,Calif. K1 ....83.50
Gary,Ind. U5 .....75.50
Geneva,Utah C11 .....75.50
Houston S5 .....83.50
Johnstown,Pa. B2 ....75.50
Lackawanna, N.Y. B2..75.50
LosAngeles B3 .....94.50
Munhall,Pa. U5 .....75.50
Seattle B3 .....94.50
So.Chicago R2, U5, W14 75.50
So.Duquesne,Pa. U5 ...75.50
So.SanFrancisco B3 ..94.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$82.00
Buffalo R2 .....82.00
Canton,O. R2, T7 ....82.00
Conshohocken,Pa. A3 ..89.00
Detroit R7 .....84.00
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 .....82.00
Houston S5 .....90.00
Ind.Harbor,Ind. Y1 ...82.00
Johnstown,Pa. B2 ....82.00
Lackawanna,N.Y. B2 ..82.00
LosAngeles B3 .....102.00
Massillon,O. R2 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
So.Chicago R2,U5, W14 82.00
So.Duquesne,Pa. U5 ...82.00
Struthers,O. Y1 .....82.00
Warren,O. C17 .....82.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$92.50
Canton,O. R2 .....92.50
Cleveland R2 .....92.50
Fontana,Calif. K1 ....113.50
Gary,Ind. U5 .....92.50
Massillon,O. R2 .....92.50
So.Chicago,Ill. R2 ....92.50
So.Duquesne,Pa. U5 ...92.50

SHEET BAR (NT)
Fontana,Calif. K1 ....$93.18

SKELP
Aliquippa,Pa. J5 .....3.85
Munhall,Pa. U5 .....3.75
Warren,O. R2 .....3.75
Youngstown R2, U5 ....3.75

WIRE RODS
AlabamaCity, Ala. R2 ..4.525
Aliquippa,Pa. J5 .....4.525
Alton,Ill. L1 .....4.70
Buffalo W12 .....4.525
Cleveland A7 .....4.525
Donora,Pa. A7 .....4.525
Fairfield,Ala. T2 .....4.525
Fontana,Calif. K1 ....5.325
Houston S5 .....4.925
Johnstown,Pa. B2 ....4.525
Joliet,Ill. A7 .....4.525
KansasCity,Mo. S5 ....4.865
LosAngeles B3 .....5.325
Minnequa,Colo. C10 ....4.775
Monessen,Pa. P7 .....4.725
No.Tonawanda,N.Y. B11 4.525
Pittsburg,Calif. C11 ....5.175
Portsmouth P12 .....4.525
Roebling,N.J. R5 ....4.625
So.Chicago,Ill. R2 ....4.525
SparrowsPoint,Md. B2..4.625
Sterling,Ill.(1) N15 ...4.525
Struthers,O. Y1 .....4.525
Torrance,Calif. C11 ...5.325
Worcester,Mass. A7 ...4.825

—STRUCTURALS—

Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ...4.10
Aliquippa,Pa. J5 .....4.10
Bessemer,Ala T2 .....4.10
Bethlehem,Pa. B2 .....4.15
Clairton,Pa. U5 .....4.10
Fairfield,Ala. T2 .....4.10
Fontana,Calif. K1 .....4.75
Gary,Ind. U5 .....4.10
Geneva,Utah C11 .....4.10
Houston S5 .....4.50
Ind.Harbor,Ind. I-2 ....4.10
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 ....4.70
Lackawanna,N.Y. B2 ...4.15
LosAngeles B3 .....4.80
Minnequa,Colo. C10 ....4.55
Munhall,Pa. U5 .....4.10
Niles,Calif. P1 .....4.80
Phoenixville,Pa. P4 ....4.15
Seattle B3 .....4.85
So.Chicago,Ill. U5, W14 4.10
So.SanFrancisco B3 ....4.75
Torrance,Calif. C11 ....4.80
Weirton,W.Va. W6 .....4.35

Wide Flange
Bethlehem,Pa. B2 .....4.15
Clairton,Pa. U5 .....4.10
Fontana,Calif. K1 ....5.10
Lackawanna,N.Y. B2 ...4.15
Munhall,Pa. U5 .....4.10
Phoenixville,Pa. P4 ....4.95
So.Chicago,Ill. U5 .....4.10

Alloy Stand. Shapes
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 .....6.40
Gary,Ind. U5 .....5.00
Munhall,Pa. U5 .....5.00
So.Chicago,Ill. U5 .....5.00

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 .....6.175
Bessemer,Ala. T2 .....6.175
Bethlehem,Pa. B2 .....6.20
Clairton,Pa. U5 .....6.175
Fairfield,Ala. T2 .....6.175
Fontana,Calif. K1 .....6.825
Gary,Ind. U5 .....6.175
Geneva,Utah C11 .....6.175
Ind.Harbor,Ind. I-2 ....6.175
Ind.Harbor,Ind. Y1 ....6.675
Johnstown,Pa. B2 .....6.20
Lackawanna,N.Y. B2 ...6.20
LosAngeles B3 .....6.85
Munhall,Pa. U5 .....6.175
Seattle B3 .....6.90
So.Chicago,Ill. U5, W14 6.175
So.SanFrancisco B3 ....6.80
Struthers,O. Y1 .....6.675

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....6.20
Lackawanna,N.Y. B2 ...6.20
Munhall,Pa. U5 .....6.125
So.Chicago,Ill. U5 .....6.125

BEARING PILES
Munhall,Pa. U5 .....4.10
So.Chicago,Ill. U5 .....4.10

—PILING—

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....4.925
Lackawanna,N.Y. B2 ...4.925
Munhall,Pa. U5 .....4.925
So.Chicago,Ill. U5 .....4.925

—PLATES—

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ...4.10
Aliquippa,Pa. J5 .....4.10
Ashland,Ky. (15) A10 ..4.10
Bessemer,Ala. T2 .....4.10
Clairton,Pa. U5 .....4.10
Claymont,Del. C22 .....4.20
Cleveland J5, R2 .....4.10
Coatesville,Pa. L7 .....4.20
Conshohocken,Pa. A3 ...4.25
Ecorse,Mich. G5 .....4.30
Fairfield,Ala. T2 .....4.10
Fontana,Calif.(30) K1 ...4.75
Gary,Ind. U5 .....4.10
Geneva,Utah C11 .....4.10
GraniteCity,Ill. G4 ....4.30
Harrisburg,Pa. C5 .....4.10
Houston S5 .....4.50
Ind.Harbor,Ind. I-2, Y1 4.10
Johnstown,Pa. B2 .....4.10
Lackawanna,N.Y. B2 ...4.10
LoneStar,Tex. L6 .....4.50
Minnequa,Colo. C10 ....4.95
Munhall,Pa. U5 .....4.10
Pittsburgh J5 .....4.10
Riverdale,Ill. A1 .....4.10
Seattle B3 .....5.00
Sharon,Pa. S3 .....4.10
So.Chicago,Ill. U5, W14 4.10
SparrowsPoint,Md. B2 ..4.10
Steubenville,O. W10 ....4.10
Warren,O. R2 .....4.10
Weirton,W.Va. W6 ....4.10
Youngstown R2, U5, Y1 4.10

PLATES, Carbon Abras. Resist.
Fontana,Calif. K1 .....5.90
Geneva,Utah C11 .....5.25

PLATES, Wrought Iron
Economy,Pa. B14 .....9.30

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.25
Bessemer,Ala. T2 .....6.25
Clairton,Pa. U5 .....6.25
Cleveland J5 .....6.25
Conshohocken,Pa. A3 ...6.25
Ecorse,Mich. G5 .....6.45
Fairfield,Ala. T2 .....6.25
Fontana,Calif. (30) K1 ..6.95
Gary,Ind. U5 .....6.25
Geneva,Utah C11 .....6.25
Ind.Harbor,Ind. I-2 ....6.25
Ind.Harbor,Ind. Y1 ....6.75
Johnstown,Pa. B2 .....6.25
Lackawanna,N.Y. B2 ...6.25
Munhall,Pa. U5 .....6.25
Pittsburgh J5 .....6.25
Seattle B3 .....7.15
Sharon,Pa. S3 .....6.25
So.Chicago,Ill. U5, W14 6.25
SparrowsPoint,Md. B2 ..6.25
Youngstown U5 .....6.25
Youngstown Y1 .....6.75

PLATES, Alloy
Claymont,Del. C22 .....5.55
Coatesville,Pa. L7 .....5.55
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.55
Johnstown,Pa. B2 .....5.55
Munhall,Pa. U5 .....5.55
Sharon,Pa. S3 .....5.55
So.Chicago, Ill. U5, W14 5.55
SparrowsPoint,Md. B2 ..5.55

FLOOR PLATES
Cleveland J5 .....5.15
Conshohocken,Pa. A3 ...5.15
Harrisburg,Pa. C5 .....5.15
Ind.Harbor,Ind. I-2 ....5.15
Munhall,Pa. U5 .....5.15
So.Chicago,Ill U5 .....5.15

PLATES, Ingot Iron
Ashland c.l. (15) A10 ..4.35
Ashland,l.c.l.(15) A10 ..4.85
Cleveland, c.l. R2 .....4.70
Warren,O. c.l. R2 .....4.70

—BARS—

BARS, Hot-Rolled Carbon
Aliquippa,Pa. J5 .....4.15
Alton,Ill. L1 .....4.35
Atlanta,Ga. A11 .....4.40
Bessemer,Ala. T2 .....4.15
Buffalo(31) R2 .....4.18
Clairton,Pa. U5 .....4.15
Cleveland(31) R2 .....4.21
Detroit R7 .....4.30
Ecorse,Mich. G5 .....4.35
Emeryville,Calif. J7 ....4.90
Fairfield,Ala T2 .....4.15
Fairless,Pa. U5 .....4.30
Fontana,Calif. K1 .....4.85
Gary,Ind. U5 .....4.15
Gadsden,Ala.(31) R2 ....4.18
Houston S5 .....4.55
Ind.Harbor,Ind. I-2, Y1 4.15
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 ....4.75
Lackawanna,N.Y. B2 ...4.15
LosAngeles B3 .....4.85
Milton,Pa. M18 .....4.15
Minnequa,Colo. C10 ....4.60
Niles,Calif. P1 .....4.85
N.Tonawanda,N.Y. B11 4.15
Pittsburg,Calif. C11 ....4.85
Pittsburgh J5 .....4.15
Portland,Oreg. O4 .....4.90
Seattle B3, N14 .....4.90
So.Chicago U5, W14 .....4.15
Chicago(31) R2 .....4.22
So.Duquesne,Pa. U5 .....4.15
So.SanFran., Calif. B3 ..4.90
Sterling,Ill.(1) N15 .....4.15
Struthers,O. Y1 .....4.15
Torrance,Calif. C11 .....4.85
Weirton,W.Va. W6 .....4.15
Youngstown U5 .....4.15
Youngstown(31) R2 .....4.20

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 .....4.875
Buffalo R2 .....4.875
Canton,O. R2, T7 .....4.875
Clairton,Pa. U5 .....4.875
Detroit R7 .....4.975
Ecorse,Mich. G5 .....5.075
Fairless,Pa. U5 .....5.025
Fontana,Calif. K1 .....5.925
Gary,Ind. U5 .....4.875
Houston S5 .....5.275
Ind.Harbor,Ind. I-2, Y1 4.875
Johnstown,Pa. B2 .....4.875
KansasCity,Mo. S5 ....5.475
Lackawanna,N.Y. B2 ..4.875
LosAngeles B3 .....5.925
Massillon,O. R2 .....4.875
Midland,Pa. C18 .....4.875
So.Chicago R2, U5,W14 4.875
So.Duquesne,Pa. U5 ..4.875
Struthers,O. Y1 .....4.875
Warren,O. C17 .....4.875
Youngstown U5 .....4.875

BARS & SMALL SHAPES, H.R.
High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.225
Bessemer,Ala T2 .....6.225
Bethlehem,Pa. B2 .....6.225
Clairton,Pa. U5 .....6.225
Ecorse,Mich. G5 .....6.425
Fairfield,Ala. T2 .....6.225
Fontana,Calif. K1 .....7.475
Gary,Ind. U5 .....6.225
Ind.Harb.,Ind. Y1 .....6.725
Ind.Harb., Ind. I-2 ....6.225
Johnstown,Pa. B2 .....6.225
Lackawanna,N.Y. B2 ...6.225
LosAngeles B3 .....6.925
Pittsburgh J5 .....6.225
Seattle B3 .....6.975
So.Chicago W14 .....6.225
So.Duquesne,Pa. U5 ....6.225
So.SanFrancisco B3 ....6.975
Struthers,O. Y1 .....6.725
Youngstown U5 .....6.225

BAR SIZE ANGLES; H.R.CARBON
Bethlehem,Pa. B2 .....4.35

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....4.15
Atlanta A11 .....4.40
Niles,Calif. P1 .....4.85
SanFrancisco S7 .....5.10

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 .....6.00
Gary,Ind. U5 .....5.00
Houston S5 .....5.60
KansasCity S5 .....5.60
Youngstown U5 .....5.00

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....5.20
BeaverFalls,Pa. M12, R2 5.20
Buffalo B5 .....5.25
Camden,N.J. P13 .....5.65
Carnegie,Pa. C12 .....5.20
Chicago W18 .....5.20
Cleveland A7, C20 .....5.20
Detroit P17, R7 .....5.35
Detroit B5 .....5.40
Donora,Pa. A7 .....5.20
Elyria,O. W8 .....5.20
FranklinPark,Ill. N5 ....5.20
Gary,Ind. R2 .....5.20
GreenBay,Wis. F7 .....5.20
Hammond,Ind. L2, M13 5.20
Hartford,Conn. R2 .....5.75
Harvey, Ill. B5 .....5.20
LosAngeles R2 .....6.65
Mansfield,Mass. B5 .....5.75
Massillon,O. R2, R8 .....5.20
Monaca,Pa. S17 .....5.20
Newark,N.J. W18 .....5.65
NewCastle,Pa. (17) B4..5.20
Pittsburgh J5 .....5.20
Plymouth,Mich. P5 .....5.45
Putnam,Conn. W18 .....5.75
Readville,Mass. C14 .....5.75
St.Louis,Mo. M5 .....5.50
So.Chicago,Ill. W14 .....5.20
SpringCity,Pa. K3 .....5.65
Struthers,O. Y1 .....5.20
Waukegan,Ill. A7 .....5.20
Worcester,Mass. W19 .....6.10
Youngstown F3, Y1 .....5.20

BARS, Cold-Finished Alloy
(turned and Ground)
Cumberland,Md. (5) C19 4.45

BARS, Cold-Finishing Alloy
Ambridge,Pa. W18 .....6.325
BeaverFalls,Pa. M12 ...6.325
Bethlehem,Pa. B2 .....6.325
Buffalo B5 .....6.325
Camden,N.J. P13 .....6.50
Canton,O. R2, T7 .....6.325
Carnegie, Pa. C12 .....6.325
Chicago W18 .....6.325
Cleveland A7, C20 .....6.325
Detroit R7 .....6.425
Detroit P17 .....6.475
Detroit B5 .....6.525
Donora,Pa. A7 .....6.325
Elyria,O. W8 .....6.325
Gary,Ind. R2 .....6.325
Hammond,Ind. L2, M13 .6.325
Hartford,Conn. R2 .....6.775
Harvey,Ill. B5 .....6.325
Lackawanna,N.Y. B2 ...6.325
Mansfield,Mass. B5 ...6.775
Massillon,O. R2, R8 ...6.325
Midland,Pa. C18 .....6.325
Monaca,Pa. S17 .....6.325
Newark,N.J. W18 .....6.65
Plymouth,Mich. P5 .....6.525
So.Chicago,Ill. R2, W14 .6.325
SpringCity,Pa. K3 .....6.50
Struthers,O. Y1 .....6.325
Warren,O. C17 .....6.325
Waukegan,Ill. A7 .....6.325
Worcester,Mass. A7 ....6.625
Youngstown F3, Y1 ....6.325

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ...4.15
Atlanta A11 .....4.40
Buffalo R2 .....4.15
Cleveland R2 .....4.15
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 .....4.15
Fairless,Pa. U5 .....4.30
Fontana,Calif. K1 .....4.85
Gary,Ind. U5 .....4.15
Houston S5 .....4.55
Ind.Harbor,Ind. I-2, Y1 4.15
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 ....4.75
Lackawanna,N.Y. B2 ...4.15
LosAngeles B3 .....4.85
Milton,Pa. M18 .....4.15
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....4.85
Pittsburg,Calif. C11 ....4.85
Pittsburgh J5 .....4.15
SandSprings,Okla. S5 ...5.00
Seattle B3, N14 .....4.90
So.Chicago,Ill. R2 .....4.15
So.Duquesne,Pa. U5 ....4.15
So.SanFrancisco B3 ....4.90
SparrowsPoint,Md. B2 ..4.15
Sterling, Ill. (1) N15 ...4.15
Struthers,O. Y1 .....4.15
Torrance,Calif. C11 ....4.85
Youngstown R2, U5 ....4.15

BARS, Reinforcing
(Fabricated; to consumers)
Johnstown, ¼-1" B2 ...5.55
KansasCity S5 .....6.35
LosAngeles B3 .....5.80
Marion,O. P11 .....5.55
Seattle N14 .....5.80
Seattle B3 .....5.85
So.SanFrancisco B3 ....5.85
SparrowsPt, ½-1" B2 ...5.55
Williamsport,Pa. S19 ...5.45

RAIL STEEL BARS
Avis,Pa.(4) J8 .....4.25
ChicagoHts.(3,4) C2 ....4.15
ChicagoHts.(3,4) I-2 ....4.15
FortWorth,Tex.(26) T4 ..4.65
Franklin,Pa.(3,4) F5 ....4.15
Marion,O.(3) P11 .....4.15
Moline,Ill.(3) R2 .....4.25
Tonawanda(3,4) B12 ....5.00
Williamsport,Pa.(3) S19 4.50
Williamsport,Pa.(4) S19 .5.45

BARS, Wrought Iron
Economy,Pa.(S.R.) B14 10.40
Economy,Pa.(D.R.)B14 12.90
Economy(Staybolt) B14 13.20
McK.Rks.(S.R.) L5 ....10.40
McK.Rks.(D.R.) L5 ....14.00
McK.Rks.(Staybolt) L5 .15.50

—SHEETS—

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 ...3.925
Allenport,Pa. P7 .....3.925
Ashland,Ky.(8) A10 ....3.925
Cleveland J5, R2 .....3.925
Conshohocken,Pa. A3 ...4.05
Detroit M1 .....4.15
Ecorse,Mich. G5 .....4.125
Fairfield,Ala. T2 .....3.925
Fairless,Pa. U5 .....4.025
Fontana,Calif. K1 .....4.70
Gary,Ind. U5 .....3.925
Geneva,Utah C11 .....4.025
GraniteCity,Ill. G4 ....4.125
Ind.Harbor,Ind. I-2, Y1 .3.925
Irvin,Pa. U5 .....3.925
Kokomo,Ind. C16 .....4.025
Lackawanna,N.Y. B2 ...3.925

Munhall,Pa. U5 ..... 3.925
Newport,Ky. N9 ..... 3.925
Niles,O. N12 ..... 5.175
Pittsburg,Calif. C11 ... 4.625
Pittsburgh J5 ..... 3.925
Portsmouth,O. P12 ... 3.925
Riverdale,Ill. A1 ..... 3.925
Sharon,Pa. S3 ..... 3.925
So.Chicago,Ill. W14 ... 3.925
SparrowsPoint,Md. B2 .. 3.925
Steubenville,O. W10 ... 3.925
Torrance,Calif. C11 ... 4.625
Warren,O. R2 ..... 3.925
Weirton,W.Va. W6 ... 3.925
Youngstown U5, Y1 ... 3.925

SHEETS, H.R. (19 gage)

AlabamaCity, Ala. R2 .. 5.225
Dover,O. R1 ..... 5.05
Kokomo,Ind. C16 ..... 5.025
Mansfield,O. E6 ..... 5.05
Niles,O. N12 ..... 4.775
Torrance,Calif. C11 ... 5.875

SHEETS, H.R. (14 ga. heavier) High-Strength Low-Alloy

Cleveland J5, R2 ..... 5.90
Conshohocken,Pa. A3 .. 5.90
Ecorse,Mich. G5 ..... 6.10
Fairfield,Ala. T2 ..... 5.90
Fontana,Calif. K1 .... 6.675
Gary,Ind. U5 ..... 5.90
Ind.Harbor,Ind. I-2 .... 5.90
Ind.Harbor,Ind. Y1 .... 6.40
Irvin,Pa. U5 ..... 5.90
Lackawanna(35) B2 .... 5.90
Munhall,Pa. U5 ..... 5.90
Pittsburgh J5 ..... 5.90
Sharon,Pa. S3 ..... 5.90
So.Chicago,Ill. U5 ..... 5.90
SparrowsPoint(36) B2 .. 5.90
Warren,O. R2 ..... 5.90
Weirton,W.Va. W6 ..... 5.90
Youngstown U5 ..... 5.90
Youngstown Y1 ..... 6.40

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 .. 4.175
Cleveland R2 ..... 4.525
Ind.Harbor,Ind. I-2 .... 4.175
Warren,O. R2 ..... 4.525

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 ..... 4.775
Cleveland J5, R2 .... 4.775
Ecorse,Mich. G5 ..... 4.975
Fairfield,Ala. T2 .... 4.775
Fairless, Pa. U5 .... 4.875
Follansbee,W.Va. F4 .. 4.775
Fontana,Calif. K1 .... 5.875
Gary,Ind. U5 ..... 4.775
GraniteCity,Ill. G4 .... 4.975
Ind.Harbor,Ind. I-2,Y1 4.775
Irvin,Pa. U5 ..... 4.775
Lackawanna,N.Y. B2 .. 4.775
Middletown,O. A10 .... 4.775
Pittsburg,Calif. C11 ... 5.725
Pittsburgh J5 ..... 4.775
Portsmouth,O. P12 .... 4.775
SparrowsPoint,Md. B2.. 4.775
Steubenville,O. W10 .... 4.775
Warren,O. R2 ..... 4.775
Weirton,W.Va. W6 .... 4.775
Youngstown Y1 ..... 4.775

SHEETS, Cold-Rolled High-Strength Low Alloy

Cleveland J5, R2 ..... 7.225
Ecorse,Mich. G5 ..... 7.425
Fontana,Calif. K1 .... 8.275
Gary,Ind. U5 ..... 7.225
IndianaHarbor,Ind. Y1 .. 7.725
Irvin,Pa. U5 ..... 7.225
Lackawanna(37) B2 .... 7.225
Pittsburgh J5 ..... 7.225
SparrowsPoint (38) B2 .. 7.225
Warren,O. R2 ..... 7.225
Weirton,W.Va. W6 .... 7.225
Youngstown Y1 ..... 7.725

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 ..... 5.375
Middletown,O. A10 .... 5.275
Warren,O. R2 ..... 5.375

SHEETS, Gal'd No. 10 Steel

AlabamaCity,Ala. R2 .. 5.275
Ashland,Ky.(8) A10 .... 5.275
Canton,O. R2 ..... 5.275
Delphos,O. N16 ..... 5.775
Dover,O. R1 ..... 5.275
Fairfield,Ala. T2 ..... 5.275†
Gary,Ind. U5 ..... 5.275†
GraniteCity,Ill. G4 .... 5.475
Ind.Harbor,Ind. I-2 .... 5.325
Irvin,Pa. U5 ..... 5.275†
Kokomo,Ind. C16 .... 5.375†
MartinsFerry,O. W10 .. 5.275
Niles,O. N12 ..... 5.275
Pittsburg,Calif. C11 .. 6.025†
SparrowsPoint,Md. B2.. 5.275
Steubenville,O. W10 .... 5.275
Torrance,Calif. C11 .. 6.275†
Weirton,W.Va. W6 .... 5.275

†Based on 5c zinc.

SHEETS, Galvanized No. 10 High-Strength Low-Alloy

Irvin,Pa. U5 ..... 7.925
SparrowsPoint(39) B2 .. 8.075

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10 .... 5.525
Canton,O. R2 ..... 6.025

SHEETS, Culvert	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.325	....
Canton,O. R2	6.475	6.925
Fairfield T2	6.075	6.325
Gary,Ind. U5	6.075	6.325
Ind.Harbor I-2	6.075	6.325
Irvin,Pa. U5	6.075	6.325
Kokomo,Ind. C16	6.175	....
MartinsFry.,O. W10	6.075	....
Pitts.,Cal. C11	6.825	....
SparrowsPt., B2	6.075	....
Torrance,Cal. C11	7.075	....

SHEETS, Culvert	Pure Iron
Ashland,Ky. A10	6.575
Fairfield,Ala. T2	6.325
MartinsFerry,O. W10	6.325

SHEETS, Galvannealed Steel

Canton,O. R2 ..... 5.825
Irvin,Pa. U5 ..... 5.825†
Kokomo,Ind. C16 .... 5.925†
Niles,O. N12 ..... 5.825

†Based on 5c zinc

SHEETS, ZINCGRIP Steel

Butler,Pa. A10 ..... 5.525
Middletown,O. A10 .... 5.525

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10 ..... 5.775
Middletown,O. A10 .... 5.775

SHEETS, Electrogalvanized

Cleveland R2 (28) 6.125
Niles,O. R2 (28) 6.125
Weirton,W.Va. W6 .... 5.975

SHEETS, ALUMINIZED

Butler,Pa. A10 ..... 8.625

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 .. 5.175
Cleveland R2 ..... 5.175
Gary,Ind. U5 ..... 5.175
GraniteCity,Ill. G4 .... 5.875
Ind.Harbor,Ind. I-2 .... 5.175
Irvin,Pa. U5 ..... 5.175
Middletown,O. A10 .... 5.175
Niles,O. N12 ..... 6.525
Youngstown Y1 ..... 5.175

BLUED STOCK, 29 ga.

Follansbee,W.Va. F4 .. 7.30
Follansbee(23) F4 .... 7.175
Yorkville,O. W10 ..... 7.20

SHEETS, Long Terne Steel (Commercial Quality)

BeechBott'm,W.Va. W10 5.675
Gary,Ind. U5 ..... 5.675
Mansfield,O. E6 ..... 5.675
Middletown,O. A10 .... 5.675
Niles,O. N12 ..... 5.675
Weirton,W.Va. W6 .... 5.675

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .... 6.075

SHEETS, Well Casing

Fontana,Calif. K1 .... 6.20

—STRIP—

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 .. 3.925
Allenport,Pa. P7 ..... 3.925
Alton,Ill. L1 ..... 4.10
Ashland,Ky.(8) A10 .... 3.925
Atlanta A11 ..... 4.175
Bessemer,Ala. T2 ..... 3.925
Bridgeport,Conn.(10) S15 4.15
Buffalo(27) R2 ..... 3.925
Carnegie,Pa. S18 .... 4.425
Conshohocken,Pa. A3 .. 4.05
Detroit M1 ..... 4.15
Ecorse,Mich. G5 ..... 4.125
Fairfield,Ala. T2 ..... 3.925
Fontana,Calif. K1 .... 4.70
Gary,Ind. U5 ..... 3.925
Houston,Tex. S5 ..... 4.325
Ind.Harbor,Ind. I-2,Y1 3.925
Johnstown,Pa.(25) B2.. 3.925
KansasCity,Mo.(9) S5.. 4.525
Lackw'na,N.Y.(25) B2 3.925
LosAngeles(25) B3 .... 4.675
Milton,Pa. M18 ..... 3.925
Minnequa,Colo. C10 .... 5.025
NewBritain(10) S15 .... 4.15
N.Tonawanda,N.Y. B11 3.925
Pittsburg,Calif. C11 .. 4.675
Portsmouth,O. P12 .... 3.925
Riverdale,Ill. A1 ..... 3.925
SanFrancisco S7 ..... 5.10
Seattle(25) B3 ..... 4.925
Seattle N14 ..... 4.925
Sharon,Pa. S3 ..... 3.925
So.Chicago,Ill. W14 ... 3.925
So.SanFrancisco(25) B3 4.675
SparrowsPoint,Md. B2.. 3.925
Torrance,Calif. C11 ... 4.675
Warren,O. R2 ..... 3.925
Weirton,W.Va. W6 .... 3.925
Youngstown U5 ..... 3.925

STRIP, Hot-Rolled Alloy

Bridgeport,Conn(10) S15 6.45
Carnegie,Pa. S18 ..... 6.40
Fontana,Calif. K1 .... 7.80
Gary,Ind. U5 ..... 6.40
Houston,Tex. S5 ..... 6.80
KansasCity,Mo. S5 .... 7.00
LosAngeles B3 ..... 7.60
NewBritn.,Conn.(10) S15 6.45
Sharon,Pa. S3 ..... 6.40
So.Chicago W14 ..... 6.40
Youngstown U5 ..... 6.40

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2 ..... 5.95
Conshohocken,Pa. A3 .. 5.90
Ecorse,Mich. G5 ..... 6.15
Fairfield,Ala. T2 ..... 5.95
Fontana,Calif. K1 .... 7.05
Gary,Ind. U5 ..... 5.95
Ind.Harbor,Ind. I-2 .... 5.95
Ind.Harbor,Ind. Y1 .... 6.45
Lackawanna,N.Y. B2 .. 6.00
LosAngeles(25) B3 .... 6.70
Seattle(25) B3 ..... 6.95
Sharon,Pa. S3 ..... 5.95
So.SanFrancisco(25) B3 6.70
SparrowsPoint,Md. B2 .. 6.00
Warren,O. R2 ..... 5.95
Weirton,W.Va. W6 .... 5.95
Youngstown Y1 ..... 6.45
Youngstown U5 ..... 5.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 .. 4.175
Warren,O. R2 ..... 4.525

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 ..... 5.45
Bridgeprt,Conn.(10) S15 5.75
Cleveland A7, J5 ..... 5.45
Dearborn,Mich. D3 .... 5.65
Detroit D2, M1, P20 .... 5.65
Dover,O. G6 ..... 5.45
Ecorse,Mich. G5 ..... 5.65
Follansbee,W.Va. F4 .. 5.45
Fontana,Calif. K1 .... 7.35
FranklinPark,Ill. T6 .... 5.70
Ind.Harbor,Ind. I-2 .... 5.70
Lackawanna,N.Y. B2 .. 5.45
LosAngeles C1 ..... 7.50
Mattapan,Mass. T6 .... 6.30
Middletown,O. A10 .... 5.45
NewBedford,Mass. R10 .. 6.00
NewBritain(10) S16 .... 5.75
NewCastle,Pa. B4, E5 .. 5.45
NewHaven,Conn. A7 .... 6.20
NewHaven,Conn. D2 .... 5.90
Pawtucket,R.I. NS, R3 .. 6.30
Pittsburgh J5 ..... 5.45
Riverdale,Ill. A1 ..... 5.70
Rome,N.Y.(28) R6 .... 5.45
Sharon,Pa. S3 ..... 5.45
SparrowsPoint,Md. B2 .. 5.45
Trenton,N.J. R5 ..... 7.00
Wall'ford,Conn. W2 .... 6.20
Warren,O.(40) T5 .... 5.45
Warren,O. B9, R2 .... 5.45
Weirton,W.Va. W6 .... 5.45
Worcester,Mass. W19 ... 7.05
Worcester,Mass. A7 .... 6.30
Youngstown C8 ..... 5.95
Youngstown Y1 ..... 5.45

STRIP, Cold-Rolled Alloy Steel

Carnegie,Pa. S18 ..... 12.00
Cleveland A7 ..... 12.00
Dover,O. G6 ..... 12.00
Fontana,Calif. K1 .... 13.65
Harrison,N.J. C18 .... 12.00
Pawtucket,R.I.(11) NS 12.15
Pawtucket,R.I.(12) NS 12.45
Sharon,Pa. S3 ..... 12.00
Worcester,Mass. A7 .... 12.30
Youngstown C8 ..... 12.00

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland J5 ..... 7.80
Cleveland A7 ..... 8.15
Dearborn,Mich. D3 .... 7.90
Dover,O. G6 ..... 8.00
Ecorse,Mich. G5 ..... 8.35
Lackawanna,N.Y. B2 .. 8.15
Pittsburgh J5 ..... 7.80
Sharon,Pa. S3 ..... 7.65
SparrowsPoint,Md. B2 .. 8.15
Warren,O. R2 ..... 7.60
Weirton,W.Va. W6 .... 8.16
Youngstown Y1 ..... 8.30

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 ..... 6.06

STRIP, Electrogalvanized

Dover,O. G6 ..... 5.45
Warren,O. B9, T5 ..... 5.45
Weirton,W.Va. W6 .... 5.45
Youngstown C8 ..... 5.70

TIGHT COOPERAGE HOOP

Atlanta A11 ..... 4.65
Riverdale,Ill. A1 ..... 4.50
Sharon,Pa. S3 ..... 4.35
Youngstown U5 ..... 4.35

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A7 American Steel & Wire
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American CladmetalsCo.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Div. H. K. Porter Co.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Products
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-7 Indiana Steel & Wire Co.
J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M16 Md. Fine & Special Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 N.Les Rolling Mill Div.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Follak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P20 Prod. Steel Strip Corp.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson S eel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Beres,O. C7	...	8.00	8.60	10.55	12.85
Bridgeport,Conn.(10) 815	5.75	7.65	8.60	10.55	12.85
Bristol,Conn. W1	...	...	8.90	10.85	....
Carnegie,Pa. S18	...	7.65	8.60	10.55	12.85
Cleveland A7	5.45	7.65	8.60	10.55	12.85
Dearborn,Mich. D3	5.65	7.85	8.80	....	....
Detroit D2	5.65	7.85	8.45	10.55	....
Dover,O. G6	5.45	7.65	8.60	10.55	12.85
FranklinPark,Ill. T6	5.70	7.80	8.75	10.70	13.00
Harrison,N.J. C18	...	...	8.90	10.85	13.15
Mattapan,Mass. T6	6.30	7.95	8.90	10.85	13.15
NewBritn.,Conn.(10) 815	5.75	7.65	8.60	10.55	12.85
NewCastle,Pa. B4	5.45	7.65	8.60	....	....
NewCastle,Pa. E5	5.45	8.00	8.60	10.55	12.85
NewHaven,Conn. D2	5.90	7.95	8.55	10.65	....
NewYork W3	...	7.95	8.90	10.85	13.15
Pawtucket,R.I. (11) N8	...	7.65	8.60	10.55	12.85
Pawtucket,R.I. (12) N8	6.65	7.95	8.90	10.85	13.15
Sharon,Pa. S3	5.45	7.65	8.60	10.55	12.85
Trenton,N.J. R5	...	7.95	8.90	10.85	13.15
Wallingford,Conn. W2	6.20	7.95	8.90	10.85	13.15
Warren,O. T5	5.45	7.65	8.60	10.55	12.85
Weirton,W.Va. W6	5.45	7.65	8.60	10.55	12.85
Worcester,Mass. A7, T6	6.30	7.95	8.90	10.85	13.15
Youngstown C8	...	7.65	8.60	10.55	12.85
Spring Steel (Tempered)					
Buffalo W12	...	...	12.50	....	....
Bristol,Conn. W1	...	...	12.50	15.00	....
FranklinPark,Ill. T6	...	...	13.25	15.75	18.75
Harrison,N.J. C18	...	...	12.50	15.00	18.00
NewYork W3	...	...	12.50	15.00	18.00
Trenton,N.J. R5	...	...	12.50	15.00	18.00
Worcester,Mass. T6	...	...	12.50	15.00	18.00
Worcester,Mass. W12	...	...	12.50	....	....
Youngstown C8	...	...	12.50	15.00	18.00

SILICON STEEL

H.R. SHEETS (22 gage) (Cut Lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	8.75	9.75	10.65
Brackenridge,Pa. A4	...	...	8.75	9.75	10.65
Granite City,Ill. G4	...	...	8.55	9.80	....
IndianaHarbor,Ind. I-2	7.85	8.15	8.75	9.75	....
Mansfield,O. E6	7.85	8.15	8.75	9.75	10.65
Newport,Ky. N9	7.85	8.15	8.75	9.75	10.65
Niles,O. N12	7.85	8.15	8.75	9.75	....
Vandergrift,Pa. U5	...	8.15	8.75	9.75	10.65
Warren,O. R2	7.85	8.15	8.75	9.75	....

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semi processed ½c lower)	Field	Armature	Electric	Motor	Dynamo
IndianaHarbor,Ind. I-2	8.05	8.40*	9.00*	....	....
Vandergrift,Pa. U5	8.05*	8.90	9.50	10.50	11.40
Warren,O. R2	8.05‡	8.90	9.50	10.50	11.40
Zanesville,O. A10	...	8.90	9.50	10.50	11.40

H.R. SHEETS (22 Gage) (Cut Lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	11.60	12.15	12.65	13.65
Brackenridge,Pa. A4	11.60	....	....	....
Newport,Ky. N9	11.60	....	....	....
Vandergrift,Pa. U5	11.60	12.15	12.65	13.65
Zanesville,O. A10	12.35‡	12.90‡	13.40‡	14.40‡

C.R. COILS & CUT LENGTHS (22 Ga.)	T-100	T-90	T-80	T-73	T-72
Butler,Pa. A10	....	....	16.25	16.75	....
Vandergrift,Pa. U5	13.65	14.65	16.25	16.75	12.35‡
Warren,O. R2	....	....	....	....	12.35‡

*Semiprocessed. †Fully processed only. ‡Coils; cut lengths ¾c lower. ‖Coils annealed; semiprocessed ½c lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.40	$7.65	$8.05
Fairfield,Ala. T2	7.50	7.75	8.15
Fairless,Pa. U5	7.50	7.75	8.15
Gary,Ind. U5	7.40	7.65	8.05
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor, Ind. I-2, Y1	7.40	7.65	8.05
Irvin,Pa. U5	7.40	7.65	8.05
Niles,O. R2	7.40	7.65	8.05
Pittsburg,Calif. C11	8.15	8.40	8.80
SparrowsPoint,Md. B2	7.50	7.75	8.15
Weirton,W.Va. W6	7.40	7.65	8.05
Yorkville,O. W10	7.40	7.65	8.05

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.70	$8.95
Fairfield,Ala. T2	8.80	9.05
Fairless,Pa. U5	8.80	9.05
Gary,Ind. U5	8.70	8.95
Ind.Har. I-2, Y1	8.70	8.95
Irvin,Pa. U5	8.70	8.95
Pitts.,Cal. C11	9.45	9.70
Sp.Pt.,Md. B2	8.80	9.05
Warren,O. R2	8.70	8.95
Weirton,W.Va. W6	8.70	8.95
Yorkville,O. W10	8.70	8.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.50
Fairfield,Ala. T2	6.60
Fairless,Pa. U5	6.60
Gary,Ind. U5	6.50
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.50
Irvin,Pa. U5	6.50
Niles,O. R2	6.50
Pittsburg,Calif. C11	7.25
SparrowsPoint,Md. B2	6.60
Warren,O. R2	6.50
Weirton,W.Va. W6	6.50
Yorkville,O. W10	6.50

HOLLOWARE ENAMELING
Black Plate (29 gage)

Follansbee,W.Va. F4	6.10
Gary,Ind. U5	6.10
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.10
Irvin,Pa. U5	6.10
Yorkville,O. W10	6.10

MANUFACTURING TERNES
(Special Coated)

Fairfield,Ala. T2	$7.85
Gary,Ind. U5	7.75
Irvin,Pa. U5	7.75
Yorkville,O. W10	7.75

MANUFACTURING TERNES, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.75
Yorkville,O. W10	9.75

MANUFACTURING TERNES, LT. Coated, 6 lb

Yorkville,O. W10	$8.65

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.75

—WIRE—

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	5.525
Aliquippa,Pa. J5	5.525
Alton,Ill. L1	5.70
Atlanta A11	5.725
Bartonville,Ill. K4	5.625
Buffalo W12	5.525
Chicago W13	5.525
Cleveland A7, C20, R2	5.525
Crawfordsville,Ind. M8	5.625
Donora,Pa. A7	5.525
Duluth,Minn. A7	5.525
Fairfield,Ala. T2	5.525
Fostoria,O. (24) S1	5.75
Houston S5	5.925
Jacksonville,Fla. M8	6.05
Johnstown,Pa. B2	5.525
Joliet,Ill. A7	5.525
KansasCity,Mo. S5	6.125
Kokomo,Ind. C16	5.625
LosAngeles B3	6.475
Minnequa,Colo. C10	5.775
Monessen,Pa. P7	5.525
No.Tonawanda B11	5.525
Palmer,Mass. W12	5.825
Pittsburg,Calif. C11	6.475
Portsmouth,O. P12	5.525
Rankin,Pa. A7	5.525
So.Chicago,Ill. R2	5.525
So.SanFrancisco C10	6.475
SparrowsPoint,Md. B2	5.625
Sterling,Ill. (1) N15	5.525
Struthers,O. Y1	5.525
Waukegan,Ill. A7	5.525
Worcester,Mass. A7	5.825

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	6.925
Alton,Ill. L1	7.10
Bartonville,Ill. K4	7.025
Buffalo W12	6.925
Cleveland A7	6.925
Donora,Pa. A7	6.925
Duluth,Minn. A7	6.925
Fostoria,O. S1	6.925
Johnstown,Pa. B2	6.925
LosAngeles B3	7.875
Millbury,Mass.(12) N6	7.225
Minnequa,Colo. C10	7.175
Monessen,Pa. P7, P16	6.925
Muncie,Ind. I-7	7.125
Palmer,Mass. W12	7.225
Pittsburg,Calif. C11	7.875
Portsmouth,O. P12	6.925
Roebling,N.J. R5	7.225
So.Chicago,Ill. R2	6.925
So.SanFran. C10	7.875
SparrowsPt.,Md. B2	7.025
Struthers,O. Y1	6.925
Trenton,N.J. A7	7.225
Waukegan,Ill. A7	6.925
Worcester A7, J4	7.225
Worcester T6, W12	7.225

WIRE, Upholstery Spring

Aliquippa,Pa. J5	6.625
Alton,Ill. L1	6.80
Buffalo W12	6.625
Cleveland A7	6.625
Donora,Pa. A7	6.625
Duluth,Minn. A7	6.625
Johnstown,Pa. B2	6.625
LosAngeles B3	7.575
Minnequa,Colo. C10	6.80
Monessen,Pa. P7, P16	6.625
NewHaven,Conn. A7	6.925
Palmer,Mass. W12	6.925
Pittsburg,Calif. C11	7.575
Portsmouth,O. P12	6.625
Roebling,N.J. R5	6.925
So.Chicago,Ill. R2	6.625
So.SanFrancisco C10	7.575
SparrowsPoint,Md. B2	6.725
Trenton,N.J. A7	6.925
Waukegan,Ill. A7	6.625
Worcester,Mass. A7	6.925

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	10.75
Bartonville,Ill. K4	10.65
Buffalo W12	10.55
Chicago W13	10.55
Cleveland A7	10.55
Crawfordsville,Ind. M8	10.65
Fostoria,O. S1	10.55
Jacksonville,Fla. M8	11.08
Johnstown,Pa. B2	10.55
Kokomo,Ind. C16	10.55
Minnequa,Colo. C10	10.30
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Roebling,N.J. R5	10.85
So.SanFrancisco C10	10.90
Waukegan,Ill. A7	10.55
Worcester,Mass. A7, T6	10.85

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	9.50
Buffalo W12	9.50
Johnstown,Pa. B2	9.50
Minnequa,Colo. C10	9.625
Monessen,Pa. P16	9.50
Muncie,Ind. I-7	9.70
Roebling,N.J. R5	9.80
SparrowsPt.,Md. B2	9.60

ROPE WIRE (A)

Alton,Ill. L1	9.45
Bartonville,Ill. K4	9.35
Buffalo, W12	9.35
Fostoria,O. S1	9.35
Johnstown,Pa. B2	9.35
Monessen,Pa. P7, P16	9.35
Muncie,Ind. I-7	9.55
Palmer,Mass. W12	9.65
Portsmouth,O. P12	9.35
Roebling,N.J. R5	9.65
SparrowsPt. B2	9.45
Struthers,O. Y1	9.35
Worcester J4, T6	9.65

(A) Plow and Mild Plow; add 0.25c for improved plow.

WIRE, Tire Bead

Alton,Ill. L1	12.75
Bartonville,Ill. K4	12.65
Monessen,Pa. P16	12.55
Roebling,N.J. R5	12.85

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	7.45
Buffalo W12	7.45
Cleveland A7	7.45
Crawfordsville,Ind. M8	7.55
Dover,O. G6	7.45
Fostoria,O. S1	7.45
Kokomo,Ind. C16	7.55
FranklinPark, Ill. T6	7.60
Massillon,O. R8	7.45
Monessen,Pa. P7, P16	7.45
Pawtkt.,R.I.(12) N8	7.75
Trenton,N.J. R5	7.75
Worcester A7, T6, W12	7.75

WIRE, Merchant Quality (6 to 8 gage)	An'ld. Galv.
Ala.City R2	6.675 7.075**
Aliquippa J5	6.675 7.20*
Atlanta A11	6.775 7.30
Bartonville(48)K4	6.775 7.30
Buffalo W12	6.675 7.075†
Cleveland A7	6.675 ....
Crawfordsville M8	6.775 7.30
Donora,Pa. A7	6.675 7.075†
Duluth,Minn. A7	6.675 7.075†
Fairfield T2	6.675 7.075†
Houston,Tex. S5	7.075 7.475
Jacksonville,Fla. M8	7.20 7.73
JohnstownB2(48)	6.675 7.225*
Joliet,Ill. A7	6.675 7.075†
KansasCity,Mo.S5	7.275 7.675
Kokomo C16	6.775 7.175†
LosAngeles B3	7.625 ....
Minnequa C10	6.925 7.325**
Monessen P7(48)	6.675 7.225
Palmer W12	6.975 7.375†
Pitts.,Calif. C11	7.625 8.025†
Rankin A7	6.675 7.075†
So.Chi'go R2	6.675 7.075**
S.S.Frn.(48)C10	7.625 8.025**
Spar'wsPt.B2(48)	6.775 7.325*
Steri'g(1)(48)	N15 6.675 7.20
Struthers,O.	Y1..6.675 7.175
Worcester A7	6.975 ....

* Based on 10c zinc; † 5c zinc; ** Subject to zinc equalization extras.

WOVEN FENCE, 9-15½ Ga. Col.

Ala.City,Ala. R2	140**
Ala.City, 17 ga. R2	235**
Ala.City 18 ga. R2	245**
Aliq'ppa,Pa.9-14½ga. J5	143*
Atlanta A11	145
Bartonville,Ill. K4	145
Crawfordsville,Ind. M8	145
Donora,Pa. A7	140†
Duluth,Minn. A7	140†
Fairfield,Ala. T2	140†
Houston,Tex. S5	148
Johnstown,Pa. B2	143
Johnstown 17 ga.,6"B2	234
Johnstown 4" B2	237
Joliet,Ill. A7	140†
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142†
Minnequa,Colo. C10	148**
Monessen,Pa. 9 ga, P7	145
Pittsburg,Calif. C11	163†
Rankin,Pa. A7	140†
So.Chicago,Ill. R2	140**
Sterling,Ill. (1) N15	143

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	149
Atlanta A11	151
Bartonville,Ill. K4	151
Crawfordsville,Ind. M8	151
Donora,Pa. A7	149
Duluth,Minn. A7	149
Fairfield,Ala. T2	149
Joliet,Ill. A7	149
KansasCity,Mo. S5	161
Kokomo,Ind. C16	151
Minnequa,Colo. C10	154
Pittsburg,Calif. C11	173
So.Chicago,Ill. R2	149
So.SanFran.,Calif. C10	173
SparrowsPoint,Md. B2	151
Sterling,Ill.(1) N15	149

WIRE, Barbed Col.

AlabamaCity R2	153**
Aliquippa J5	150*
Atlanta A11	158
Bartonville,Ill. K4	158
Crawfordsville,Ind. M8	158
Donora,Pa. A7	153†
Duluth,Minn. A7	153†
Fairfield,Ala. T2	153†
Houston,Tex. S5	161
Johnstown,Pa. B2	156*
Joliet,Ill. A7	153†
KansasCity,Mo. S5	165
Kokomo,Ind. C16	155†
Minnequa,Colo. C10	159**
Monessen,Pa. P7	157
Pittsburg,Calif. C11	173†
Rankin,Pa. A7	153†
So.Chicago,Ill. R2	153**
S.SanFrancisco C10	176**
SparrowsPoint,Md. B2	158*
Sterling,Ill. (1) N15	156

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

WIRE, (16 gage) Stone	An'ld. Galv. Stone
Ala.City R2	12.50 14.05**
Aliquippa J5	12.50 14.30*
Bartonville K4	12.60 14.40
Buffalo W12	12.50 ....
Cleveland A7	12.50 ....
Crawfordsville-M8	12.50 14.30
Fostoria,O. S1	12.60 14.15
Johnstown B2	12.50 14.35*
Kokomo C16	12.60 14.15†
Minnequa C10	12.75 14.45**
Palmer,Mass.W12	12.50 14.05†
Pitts.,Calif. C11	12.85 14.40†
SparrowsPt. B2	12.60 14.45*
Sterling(1) N15	12.50 14.30
Waukegan A7	12.50 14.05†
Worcester A7	12.80 ....

* Based on 11c zinc; † 5c zinc; ** Subject to zinc equalization extras.

NAILS, Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala R2	131
Aliquippa,Pa. J5	131
Atlanta A11	133
Bartonville,Ill. K4	133
Chicago,Ill. W13	131
Cleveland A9	137
Crawfordsville,Ind. M8	133
Donora,Pa. A7	131
Duluth,Minn. A7	131
Fairfield,Ala. T2	131
Galveston,Tex. D7	139
Houston,Tex. S5	139
Johnstown,Pa. B2	131
Joliet,Ill. A7	131
KansasCity,Mo. S5	143
Kokomo,Ind. C16	133
Minnequa,Colo. C10	136
Monessen,Pa. P7	131
Pittsburg,Calif. C11	150
Rankin,Pa. A7	131
So.Chicago,Ill. R2	131
SparrowsPt.,Md. B2	133
Sterling,Ill. (1) N15	131
Worcester,Mass. A7	137

NAILS, CUT (100 lb keg)

To dealers (33)	
Conshohocken,Pa. A3	$8.00
Wheeling,W.Va. W10	8.00

STAPLES, Polished Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	133
Aliquippa,Pa. J5	133
Atlanta A11	135
Bartonville,Ill. K4	135
Crawfordsville,Ind. M8	135
Donora,Pa. A7	133
Duluth,Minn. A7	133
Fairfield,Ala. T2	133
Johnstown,Pa. B2	133
Joliet,Ill. A7	133
Kokomo,Ind. C16	135
Minnequa,Colo. C10	138
Monessen,Pa. P7	133
Pittsburg,Calif. C11	152
Rankin,Pa. A7	133
So.Chicago,Ill. R2	133
SparrowsPt.,Md. B2	135
Sterling,Ill. (1) N15	133
Worcester,Mass. A7	139

—FENCE POSTS—

	Col.
ChicagoHts.,Ill. C2, I-2	145
Duluth,Minn. A7 (49)	145
Franklin,Pa. F5	145
Johnstown,Pa. B2	145
Marion,O. P11	145
Minnequa,Colo. C10	150
Moline,Ill. R2	145
So.Chicago,Ill. R2	145
Tonawanda,N.Y. B12	148
Williamsport,Pa. S19	158

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Sizes—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25
Ambridge, Pa. N2 (†)	15.75	...	19.75	...	22.25	...	23.75	...	23.75	...	23	...	25.5	...
Lorain, O. N3 (*)	15.75	4.5	19.75	5.5	22.25	8	23.75	9.5	23.75	9.5	23	8.75	25.5	11.25
Youngstown Y1 (††)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2 (**)	15.75	0.75	19.75	3	22.25	5.5	23.75	7	23.75	7	23	6.25	25.5	8.75

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Sizes—Inches	⅛		¼		⅜		½		¾		1		1¼		1½	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c		27.5c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28		2.73	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	...	...	...	...	...	...	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Alton, Ill. L1 (§)	...	...	...	...	...	...	24.25	9	27.25	13	29.75	16.5	32.25	17.5	32.75	18.25
Benwood, W. Va. W10(††)	25.5	+0.25	17.75	+5.5	10.25	+10	26.25	11	29.25	15	31.75	18.5	34.25	19.5	34.75	20.25
Butler, Pa. F6 (†)	26.5	+2.75	19.5	+7.25	12.5	+13	...	...	...	...	...	...	...	...	...	...
Etna, Pa. N2 (†)	...	...	...	...	...	...	26.25	7	29.25	11	31.75	14.5	34.25	16.25	34.75	17.25
Fairless, Pa. N3	...	...	...	...	...	...	24.25	...	27.25	...	29.75	...	32.25	...	32.75	...
Fontana, Calif. K1 (§)	...	...	...	...	...	...	13.25	+3	16.25	1	18.75	4.5	21.25	5.5	21.75	6.5
Ind. Harbor Y1 (††)	...	...	...	...	...	...	25.25	9	28.25	13	30.75	16.5	33.25	17.5	33.75	18.5
Lorain, O. N3 (*)	...	...	...	...	...	...	26.25	16	29.25	20	31.75	23.5	34.25	23	34.75	24
Sharon, Pa. S4 (‡)	26.5	−0.25	19.50	+4.25	12.5	+8.5	...	...	...	...	...	...	...	...	...	...
Sharon, Pa. M6	...	...	...	...	...	...	26.25	11	29.25	15	31.75	18.5	34.25	19.25	34.75	20.25
Sparrows Pt., Md. B2 (§)	24.5	+1.75	17.5	+6.25	10.5	+10.5	24.25	8	27.25	12	29.75	15.5	32.25	16.5	32.75	17.5
Youngstown R2 (**)	...	...	...	...	...	...	26.25	11	29.25	15	31.75	18.5	34.25	19.25	34.75	20.25
Youngstown Y1 (††)	...	...	...	...	...	...	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Wheatland, Pa. W9 (§)	24.5	+1.75	17.5	+6.25	10.5	+10.5	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5

Size—Inches	2		2½		3		3½		4	
List Per Ft	37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	35.25	20	36.75	20	36.75	20	...	...	...	...
Alton, Ill. L1 (§)	33.25	18.75	34.75	18	34.75	18	...	...	...	...
Benwood, W.Va. W10(††)	35.25	20.75	36.75	20.5	36.75	20.5	27.75	11	27.75	11
Etna, Pa. N2 (†)	35.25	17.25	36.75	18.5	36.75	18.5	27.75	9	27.75	9
Fairless, Pa. N3	33.25	...	34.75	...	34.75	...	25.75	...	25.75	...
Fontana, Calif. K1 (§)	22.25	7	23.75	7	23.75	7	...	...	...	...
Ind. Harbor, Ind. Y1 (††)	34.25	19	35.75	19	35.75	19	...	...	...	...
Lorain, O. N3 (*)	35.25	24.5	36.75	23	36.75	23	...	...	...	...
Sharon, Pa. M6	35.25	20.75	36.75	20.5	36.75	20.5	...	...	...	...
Sparrows Pt., Md. B2 (§)	32.25	18	34.75	18	34.75	18	25.75	8.5	25.75	8.5
Youngstown R2 (**)	35.25	20.75	36.75	20.5	36.75	20.5	27.75	11	27.75	11
Youngstown Y1 (††)	35.25	20	36.75	20	36.75	20	...	...	...	...
Wheatland, Pa. W9 (‡)	35.25	20	36.75	20	36.75	20	...	...	...	...

Galvanized pipe discounts based on zinc price of: (†), 14c; (‡), 11c to under 12c; (*), 5c; (§), 10c to under 11c; (††), 10.50c-11.50c; with discounts adjusted on price of zinc at time of shipment.

BOILER TUBES

Net base c.l. prices, dollar per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	...	21.31	18.44
1¼	13	...	25.24	18.12
1½	13	23.12	27.89	20.01
1¾	13	26.84	32.37	23.66
2	13	30.08	36.28	26.51
2¼	13	34.18	41.23	29.86
2¼	12	37.10	44.75	32.41
2½	12	40.51	48.86	35.70
2¾	12	43.85	52.90	38.66
3	12	45.92	55.39	41.23

RAILWAY MATERIALS

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	4.325	4.225	4.275	5.20
Ensley,Ala. T2	4.325	4.225	....	5.20
Fairfield,Ala. T2	....	....	....	5.20
Gary,Ind. U5	4.325	4.225	4.275	...
Huntington,W.Va. W7	....	....	....	5.20
IndianaHarbor,Ind. I-2	4.325	4.225	4.275	...
Johnstown,Pa. B2	....	....	....	(16)5.20
Lackawanna,N.Y. B2	4.325	4.225	....	5.20
Minnequa,Colo. C10	4.325	4.125	....	5.70
Steelton,Pa. B2	4.325	4.225	....	...
Williamsport,Pa. S19	....	....	....	5.20

TIE PLATES	
Fairfield,Ala. T2	.5.125
Gary,Ind. U5	.5.125
Ind.Harbor,Ind. I-2	...5.125
Lackawanna,N.Y. B2	..5.125
Minnequa,Colo. C10	..5.125
Pittsburg,Calif. C11	...5.275
Seattle B3	.....5.275
Steelton,Pa. B2	.....5.125
Torrance,Calif. C11	..5.275

TRACK BOLTS (20) Treated	
Cleveland R2	.....11.00
KansasCity,Mo. S5	....11.00
Lebanon,Pa. B2	.....11.00
Minnequa, Colo. C10	...11.00
Pittsburgh O3, P14	....11.00

JOINT BARS	
Bessemer,Pa. U5	....5.275
Fairfield,Ala. T2	.....5.275
Ind.Harbor,Ind. I-2	...5.275
Joliet,Ill. U5	.....5.275
Lackawanna,N.Y. B2	..5.275
Minnequa,Colo. C10	..5.275
Steelton,Pa. B2	.....5.275

AXLES	
Ind.Harbor,Ind. S13	....6.50
Johnstown,Pa. B2	.....6.50

STANDARD TRACK SPIKES	
Ind,Harbor,Ind. I-2, Y1	7.05
KansasCity,Mo. S5	....7.30
Lebanon,Pa. B2	.....7.05
Minnequa,Colo. C10	....7.05
Pittsburgh J5	.....7.05
Seattle B3	.....7.55
So.Chicago,Ill. R2	....7.05
Struthers,O. Y1	.....7.05
Youngstown R2	.....7.05

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 8.90c
⅜-in. under .....26.5 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants, per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam.	4
⅝-in. & ¾-in.	5
⅞-in. and larger	3
Longer than 6 in.:	
All diams.	+4
Lag bolts, all diams.:	
6 in. and shorter	12
Over 6 in. long.	8
Ribbed Necked Carriage	5
Blank	25
Plow	25
Step, Elevator, Tap and Sleigh Shoe	12
Tire Bolts	List
Boiler & Fitting-Up Bolts	23

NUTS

H.P. & C.P., regular & heavy:	
Square, all sizes	58
H.P., Hex, regular & heavy:	
⅝" and smaller	58
¾" to 1⅛", inclusive	60
1¼" to 1½", inclusive	62
1⅝" and larger	58
C.P. Hex, regular heavy:	
All sizes	58
Hot Galv. Nuts (all types):	
¾" and smaller	40
⅞" to 1½", inclusive	43
Finished Hex Nuts:	
New standard, all sizes	58
Semifinished & Slotted Hex.:	
Regular and heavy, all sizes	58

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	34
1 in. and smaller diam. x over 6 in.	20

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	34
¼-in. diam. & larger	14
N.F. thread, all diams.	8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	47.5 & 10
Plated finishes	30 x 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
⅝-in. & smaller	38
¾-in. through 1 in.	22
Longer than 6 in.:	
⅝-in. and smaller	20
¾-in. through 1 in.	7

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron:	
98+% Fe, annealed	18.00
Unannealed	14.50
Swedish, c.l.f. N.Y., c.l., in bags	11.25
Electrolytic iron:	
Annealed, 99.5% Fe	42.50
Unannealed (99+% Fe)	36.50
Unannealed (99+% Fe) (minus 325 mesh)	53.50
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron:	
97.9-99.8% size 5 to 10 microns	83.00-148.00
Aluminum:	
Atomized, 500 lb drums, freight allowed:	
Carlots	31.00
Ton lots	34.00
Antimony, 500 lb lots	32.00*
Brass, 20-ton lots	29.25-36.50
Bronze, 10-ton lots	51.00-60.00
Copper:	
Electrolytic	13.50*
Reduced	13.50*
Lead	7.50*
Magnesium	75.00-85.00
Manganese:	
Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel unannealed	89.50
Nickel-Silver 5-ton lots	47.00
Silicon	43.50
Solder	8.50*
Stainless Steel, 302	91.00
Tin	14.00*
Zinc, 10-ton lots	17.50-25.00
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	4.95
Less than 1000 lb	5.10
Chromium, electrolytic 99.9% Cr min.	3.60

*Plus cost of metal.

Footnotes

(1) Chicago base.
(2) Angles, flat, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅝" to 1 7/16"; 1 7/16" to 1 15/16" 4.58c; 1 15/16" to 7 5/16" 4.95c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths to fabricators; to consumers, 5.40c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon and 0.25c for H.S.-L.A.
(31) Base; deld. within mill county.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" and narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(48) 6.7 gage.
(49) T post; deduct 2 cols for U post.

STAINLESS STEEL MILL PRICES

(Representative prices, cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. Bars; H.R. Strip	Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.25	20.50	29.50	34.25	29.75	35.25	37.25	46.25	38.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	45.50	41.50
302B	18.50	24.50	30.50	34.50	35.00	35.50	37.50	48.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	48.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	48.75	43.75
304L	....	....	....	36.75	....	....	42.75	45.25	54.25	49.00
306	19.50	25.50	....	36.25	37.00	37.50	42.00	51.75	46.75
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	55.25	48.00
309	26.50	34.75	43.25	49.25	49.25	50.50	53.75	63.50	62.00
309S	28.50	37.50	47.50	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	66.25	67.50	67.50	69.00	72.25	78.75
314	....	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.75	54.50	55.00	55.50	59.00	64.50	66.50
316L	....	....	....	52.50	....	....	61.00	64.25	70.00	72.00
317	33.00	43.50	58.25	66.75	67.50	68.25	70.75	77.00	79.25
318	33.50	44.00	55.25	64.50	66.25	65.50	68.75	78.00	80.25
321	22.75	29.50	35.25	40.75	42.00	42.00	46.00	55.50	54.50
330	....	....	....	58.00	....	....	68.50	70.00	73.75	77.75
347	24.50	32.25	39.50	45.75	46.50	46.75	51.25	60.75	59.25
403	....	....	....	27.00	30.75	....	32.00	34.25	44.00	41.25
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	42.50	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	40.75	34.25
416	....	....	24.50	28.25	....	29.25	30.50	41.25	41.25
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	49.25	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	43.50	34.75
430F	....	18.75	25.00	28.75	....	29.75	31.00	44.00	44.00
431	14.50	28.50	25.00	28.25	27.50	29.25	30.50	44.00	35.25
440A,B,C	....	28.50	29.25	34.00	....	35.00	38.50	49.25	52.75
442	....	....	....	28.00	....	....	30.50	35.25	48.25	47.75
446	....	....	....	33.75	38.25	53.00	39.50	49.75	59.75	71.00
501	....	....	....	14.00	14.50	21.25	16.00	18.25	30.50	29.00
502	....	....	....	15.25	16.00	22.25	17.00	20.00	31.75	30.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Shenango Agaloy Tube Co.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

CLAD STEEL

Cladding Stainless	Plates: Carbon Base 10%	Plates: Carbon Base 20%	Sheets: Carbon Base 20%	Sheets: Copper Base Both Sides
302	....	31.00	31.00	77.00
304	27.60	32.50-32.70	32.50	77.00
310	36.50	41.00	.....	144.00
316	32.60	37.70-42.75	42.75	....
318	37.00	42.20	.....	....
321	29.30	34.40-37.00	37.00	111.00
347	30.40	35.50-40.50	40.50	130.00
405	23.40	30.60	.....	....
410	22.90	30.10	.....	....
430	22.90	30.10	.....	....
Inconel	41.23	54.18	.....	165.00
Nickel	37.50	50.90	.....	....
Monel	38.90	51.80	.....	....
Copper*	....	.....	46.00	....

	Strip, Carbon Base: Cold-Rolled 10%	Cold-Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Copper*	27.85	35.85	24.00	32.25

*Deoxidized. Production points: Stainless sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates Coatesville L7; copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie, Pa. A13.

TOOL STEEL

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.25	5% Cr Hot Work	0.39
Extra Carbon	0.30	W-Cr Hot Work	0.41
Special Carbon	0.355	V-Cr Hot Work	0.42-.43
Oil Hardening	0.37-.390	Hi-Carbon-Cr.	0.665-.70

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20	4.25	1.6	12.25	....	3.875
18	4.25	1	4.75	....	2.160-2.320
18	4	2	9	....	2.515
18	4	2	....	....	1.640
18	4	1	....	....	1.480
13.5	4	3	....	....	1.735
6.4	4.5	1.9	....	5	1.005-1.055
6	4	3	....	6	1.240
2	1.4	1.2	....	....	0.495
1.5	4	1	....	8.5	0.866-0.895

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

PIG IRON Gross Ton

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
AlabamaCity R2	52.38	52.88	....	....
Birmingham R2	52.38	52.88	....	....
Birmingham U6	....	52.88	....	....
Woodward,Ala. W15	52.38	52.88	56.50†	....
Cincinnati, deld.	....	60.43	....	....
Buffalo District				
Buffalo R2, H1	56.00	56.50	57.00	....
Tonawanda,N.Y. W12	56.00	56.50	57.00	....
No.Tonawanda,N.Y. T9	....	56.50	57.00	....
Boston, deld.	66.65	67.15	67.65	....
Rochester,N.Y., deld.	59.02	59.52	60.02	....
Syracuse,N.Y., deld.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Gary,Ind. U5	56.00	....	56.50	....
IndianaHarbor,Ind. I-2	56.00	....	56.50	....
So.Chicago,Ill. W14, Y1	56.00	56.50	56.50	....
So. Chicago,Ill. U6	56.00	....	56.50	57.00
Milwaukee, deld.	58.17	58.67	58.67	59.17
Muskegon,Mich., deld.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	....
Akron,O., deld. from Cleve.	58.75	59.25	59.25	59.75
Lorain,O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem,Pa. B2	58.00	58.50	59.00	59.50
New York, deld.	....	62.28	62.78	....
Newark, deld.	61.02	61.52	62.02	62.52
Birdsboro,Pa. B10	58.00	58.50	....	....
Steelton,Pa. B2	58.00	58.50	59.00	59.50
Swedeland,Pa. A3	58.00	58.50	59.00	59.50
Philadelphia, deld.	59.66	60.16	60.66	61.16
Troy,N.Y. R2	58.00	58.50	59.00	....
Pittsburgh District				
Nevillelsland,Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Ambridge, Aliquippa, deld.	57.37	57.87	57.87	58.37
McKeesRocks, deld.	57.04	57.54	57.54	58.04
Lawrenceville,Homestead, Wilmerding,Monaca, deld.	57.66	58.16	58.16	58.66
Verona,Trafford, deld.	58.19	58.69	58.69	59.19
Brackenridge, deld.	58.45	58.95	58.95	59.45
Bessemer,Pa. U5	56.00	....	56.50	57.00
Clairton,Rankin,So.Duquesne,Pa. U5	56.00	....	....	....
McKeesport,Pa. N3	56.00	....	....	57.00
Midland,Pa. C18	56.00	....	....	....
Monessen,Pa. P7	56.00	....	....	....
Youngstown District				
Hubbard,O. Y1	....	....	56.50	....
Sharpsville,Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield,O., deld.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie,Pa. I-3	56.00	56.50	56.50	57.00
Everett,Mass. E1	59.50	63.00	63.50	....
Fontana,Calif. K1	62.00	62.50	....	....
Geneva,Utah C11	56.00	56.50	....	....
GraniteCity,Ill. G4	57.90	58.40	58.90	....
Ironton,Utah C11	56.00	56.50	....	....
LoneStar,Texas L6	52.00	52.50*	52.50	....
Minnequa,Colo. C10	58.00	59.00	59.00	....
Rockwood,Tenn. T3	....	....	56.50	....
Toledo,O. I-3	56.00	56.50	56.50	57.00
Cincinnati, deld.	61.76	62.26	....	....

*Low phos. southern grade. †Phos., 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson,O. G2, J1	$67.00
Buffalo H1	68.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.45 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$87.50
Keokuk,Iowa, Openhearth & Fdry, freight allowed K2	92.00
Keokuk, OH & Fdry, 12½ lb piglets, 16% Si, frt. allowed K2	95.00
Wenatchee,Wash. OH & Fdry, freight allowed K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$61.00
Rockwood,Tenn. T3	70.00
Steelton,Pa. B2	64.00
Philadelphia, deld.	67.55
Troy,N.Y. R2	64.00

YOUNGSTOWN

DOUBLE FURNACE PUSHER SLAB UNPILER AND FEEDER

SLAB SIZES
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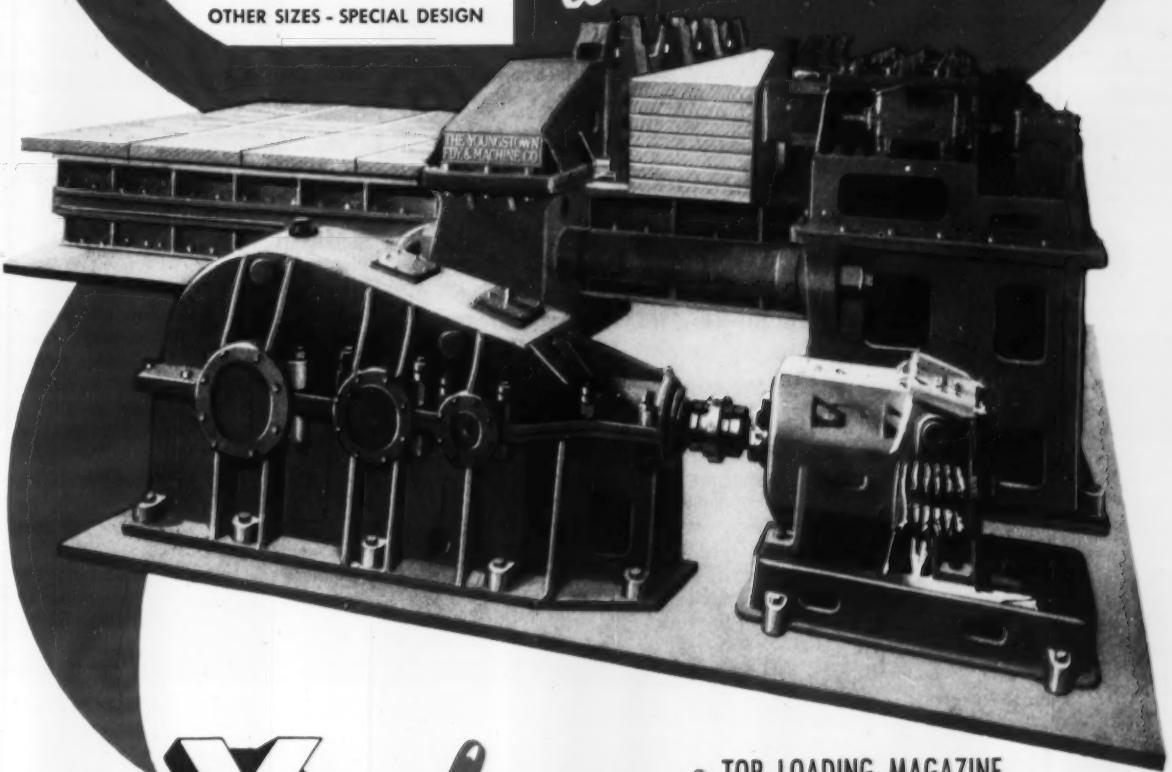
TWO ROWS: 6'-0" MINIMUM
WIDTH: 24" TO 45"
THICKNESS: 3" TO 7½"
OTHER SIZES - SPECIAL DESIGN

built better to do a better job!



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SPECIAL PUSHERS DESIGNED FOR ANY OPERATING REQUIREMENTS

The Youngstown Foundry & Machine Co.

OVER SIXTY YEARS OF SERVICE TO THE STEEL INDUSTRY

Youngstown, Ohio

15

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except: New York, 30 cents; Philadelphia, 25 cents; Birmingham, Erie, Cincinnati, St. Paul, 15 cents; Seattle and Spokane, Wash., no charge.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Baltimore	6.20	7.64	7.78	7.00	...	6.86	8.17[6]	12.04	6.98	6.85	7.98
Birmingham	6.10	7.00	8.00[2]	6.30	...	6.15	8.90	....	6.35	6.35	8.25
Boston	6.89	7.83	9.18	7.13	...	6.87	8.35	12.28	7.06	7.13	8.26
Buffalo	6.18	7.15	8.96	6.79	...	6.35	7.70	12.17	6.59	6.68	7.88
Charlotte, N. C.	6.95	7.80	8.69	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.18	7.12	8.00	6.42	...	6.28	7.30	11.75	6.46	6.33	7.46
Cincinnati	6.51	7.19	8.42	6.72	...	6.58	7.66	12.17	6.93	6.80	7.88
Cleveland	6.18	7.12	7.90	6.58	...	6.34	7.40	11.89	6.79	6.50	7.79
Detroit	6.38	7.29	8.27	6.69	7.36	6.56	7.60	11.92	6.90	6.80	7.80
Erie, Pa.	6.13	...	8.15	6.38	...	6.23	7.50[6]	....	6.50	6.36	7.79
Houston	7.15	7.60	9.40	7.45	9.30	7.45	9.30	....	7.35	7.20	8.55
JerseyCity,N.J.	6.54	7.45	8.42	6.82	...	6.75	8.43[6]	11.84	6.50	6.67	8.01
Los Angeles	7.25	9.00	9.35	7.55	11.20	7.15	9.10	13.05	7.35	7.20	9.25
Milwaukee	6.35	7.29	8.17	6.59	...	6.45	7.57	11.92	6.63	6.50	7.63
Moline, Ill.	6.53	7.47	8.35	6.77	...	6.63	7.65	....	6.81	6.68	...
New York	6.54	7.45	8.42	6.82	...	6.75	8.43[6]	11.84	6.50	6.67	8.01
Newark, N. J.	6.78	7.75	8.42	7.16	...	7.06	8.43[6]	....	6.90	6.99	8.30
Norfolk, Va.	6.90	...	...	7.20	...	7.20	8.50	....	7.20	7.15	7.85
Philadelphia	6.17	7.13	7.90	7.02	8.80	6.87	8.19[6]	11.89	6.67	6.63	7.65
Pittsburgh	6.18	7.12	8.00	6.55	...	6.28	7.65	11.89	6.46	6.33	7.46
Portland, Oreg.	8.15	8.70	9.40	7.90	...	7.60	10.65	....	7.50	7.55	9.40
Richmond, Va.	6.50	7.45	8.00	7.10	...	7.05	7.95	....	7.10	6.85	8.10
St. Louis	6.48	7.42	8.30	6.72	...	6.58	7.70	12.05	6.86	6.72	7.86
St. Paul	6.84	7.78	8.66	7.08	...	6.94	8.06	....	7.12	6.99	8.12
San Francisco	7.35	8.70	10.15	7.60	...	7.15	9.75	13.05	7.25	7.20	9.25
Seattle	8.15	9.50	9.80	8.00	...	7.60	10.65	13.50	7.50	7.60	9.40
Spokane	8.15	9.40[7]	9.80	7.60	...	7.60	10.55[8]	14.15	7.25	7.35	9.80
Washington	6.71	8.15	8.35	7.51	...	7.37	8.43	....	7.49	7.36	8.49

*Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extras excluded); ‡ includes 35-cent special bar quality extra; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, and cold-finished bars, 2000 lb and over, except in Seattle where base is 2000 to 9999 lb; [2]—500 to 9999 lb; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 lb to 3999; [8]—under ¼ in.

Size of Warehouse Steel Orders Shrinks

Bookings are for small quantities, indicating that many manufacturers are still reducing inventories. An increasing percentage of business calls for cut pieces

Cleveland—While order volume is off from a year ago, local warehouse business is not down as much as had been anticipated by some operators.

Limited competition from imported bars and sheets is reported here and in the Youngstown district. However, such competition does not compare with that reportedly being encountered at Atlantic coast points.

Philadelphia—Warehouse business in January was off from that of December. Distributors are hesitant to prognosticate the trend in February. However, while orders are small, they are more numerous and involve an increasing percentage of cut pieces. Cutting departments at most warehouses are unusually active and in a few instances are behind schedule.

Chicago—Steel warehouses are experiencing a slight pickup in sales but it isn't enough to be indicative. They are servicing about as many customers as ever but individual orders are down. It would appear that manufacturers continue to practice inventory reduction.

New York—Nickel stainless steel sales are up slightly, but total carbon and alloy volume is little improved. Carbon products are subject to sharp competition with imported steel reported selling below prices quoted by warehouses on domestic steel.

Pittsburgh—Volume of purchases is improving, although buying is of small quantities. Warehouse business is picking up in stainless and alloy steels. Some distributors say carbon steel sales in January trailed those in December, the lowest month of last year. Standard structural shapes are finally easing in supply, but light beams are still hard to obtain.

Boston—Warehouse sales volume in January barely equalled that in December. With some houses the total was slightly below. Stocks of carbon products for current demand are top-heavy and warehouses are buying less from mills. Carbon sheet inventories

STEEL IMPORT PRICES

(Base, per 100 lb, landed, duty paid)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A-305	$4.75	$4.85	$4.75	$5.00
Bar Size Angles	4.39	4.49	4.39	4.67
Structural Angles	4.39	4.49	4.39	4.67
I-Beams	4.39	4.49	4.39	4.67
Wide Flange Beams	4.94	5.02	4.94	5.22
Sheet and Plate, 10 gage, 11 gage, 5' x 10'	5.87	5.96	5.87	6.25
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.00	25.70	25.50	26.34
Barbed Wire	6.20	6.30	6.20	6.48
Merchant Bars	4.65	4.75	4.65	4.93
Hot Rolled Bands	4.65	4.75	4.65	4.93
Wire Rods, Thomas Commercial No. 5	4.77	4.84	4.82	5.09
Wire Rods, O-H, Cold Heading Quality No. 5	5.23	5.30	5.28	5.55
Channels	4.49	4.59	4.49	4.77
Bright Common Wire Nails, 8d	6.55	6.65	6.60	6.85

Size O.D.	Wgt/Foot/Lb	Gulf Port	West Coast	Vancouver
Seamless A.P.I. Casing, Grade J-55:				
5½ in.	15.5	$1.47/ft	$1.51/ft	$1.32/ft
7 in.	23	2.10/ft	2.17/ft	1.90/ft
Seamless N-80 Casing:				
5½ in.	17	1.94/ft	2.00/ft	1.75/ft
7 in.	23	2.50/ft	2.70/ft	2.36/ft
Seamless J-55 Tubing:				
2⅜ in.	4.7	0.60/ft	0.63/ft	0.55/ft
2⅞ in.	6.5	0.80/ft	0.83/ft	0.73/ft

Sources of shipment: Western continental European (Schuman Plan) countries.

are excessive in spots. Coils for slitting are in ample supply.

Detroit—Warehouse sales here are off considerably from the like period a year ago, running currently at about the December level. Occasional price shading and dropping of extras are reported.

Cincinnati — January has been a better month than December for steel warehouses here and it appears likely February will top January.

Los Angeles—Warehouse order volume is steady despite slower inquiry pace. Distributors say only 25 per cent of inquiries result in sales.

Seattle — Warehouses report increased competition and return to prewar conditions. Prices are firm here, except on special items.

Buyers are showing little interest in foreign steel, although European products, particularly reinforcing, small size angles and light bars, are offered 2 cents or more under domestic levels, shipments in two to four weeks, delivery here in about 60 days.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 151

New York—Supply has not only long since caught up with demand in the bolt and nut market, but has surpassed it. Manufacturers can give prompt deliveries, and surpluses in buyers' hands are popping up all over. Considerable tonnage is offered for resale.

Structural requirements are good, but hardware jobbers are not buying, government demands are nil and export demands likewise are at a standstill. On the other hand, import shipments are arriving in ever-increasing volume.

Semifinished Steel . . .

Semifinished Prices, Page 148

Youngstown — Youngstown Sheet & Tube Co. will curtail iron and steel production at its Brier Hill works for about three weeks beginning Jan. 31 to permit rebuilding of its blooming mill. This will idle temporarily 800 to 900 workmen, in addition to several hundred furloughed for lack of business.

Two blast furnaces are being banked and six open hearths tapped out, but the coke plant will stay in operation and other parts of the plant will operate as required.

A bank of seamless tube rounds has been built up to keep the seamless mills at the Campbell works supplied. A 43-inch bed and other improvements are projected for the Brier Hill works, installation to require 18 or 19 days.

Sheetmakers Expecting Heavier Buying

Mills anticipate comfortable first quarter volume though demand currently is disappointing. February seen bettering January showing with further gain in March likely

Sheet and Strip Prices, Page 148 & 149

Cleveland—Sheetmakers still are confident orders will burgeon appreciably before the current quarter ends although, to date, volume has been disappointing. Expectations are February rolling schedules will better those of January though rolling of deferred tonnage from last quarter will not be as prominent in the month's schedules as in January.

Republic Steel Corp. has issued revised lists of extras on galvanized flat sheets, formed roofing, siding and accessories, and on galvannealed and oven lining sheets. Both cards went into effect Jan. 22, in the case of galvanized flat sheets superseding the card issued May 11, 1953, and in the case of galvannealed sheets superseding the card issued May 22 last year.

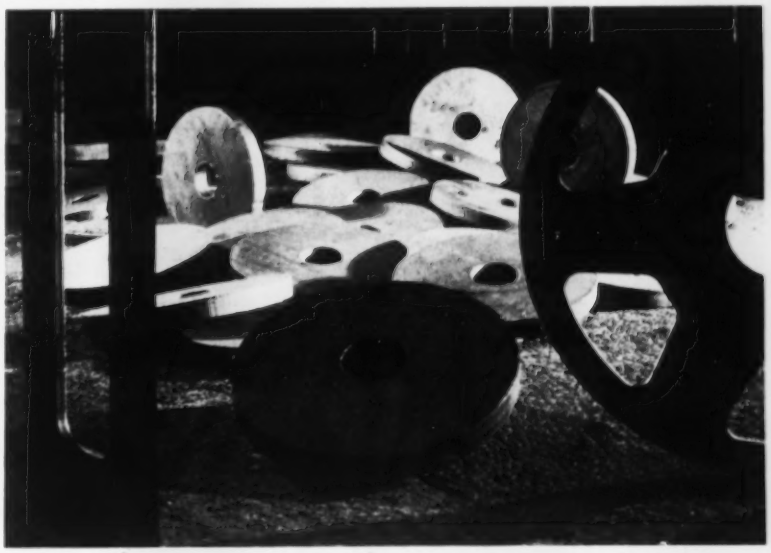
New York—Sheet demand is increasing. While schedules will not be filled, February rollings will be up from January, and from present indications March rollings will show an increase over February. Deferments from last quarter are contributing substantially to current rollings, but are expected to be worked off substantially by the end of March.

Some new tonnage is beginning to appear for April and mills are showing no hesitancy in accepting. Actually there will be little formality in the opening of books for next quarter. As tonnage arises for next period, mills will enter it promptly, if it is desirable at all.

Philadelphia—Some sheet producers anticipate increased rollings this month, but others don't. All agree they will not have anywhere near the tonnage they can handle. General expectation is that the trend will be up rather than down, but how soon there will be appreciable gain remains a question.

Boston—Cold-rolled sheet consumers experience no difficulty in placing orders for February delivery. Exceptions are one or two mills with heavier automobile volume. Numerous buyers of flat-rolled are confining orders to 30-day shipments and the trend points to continuance of this policy until mill deliveries are more extended.

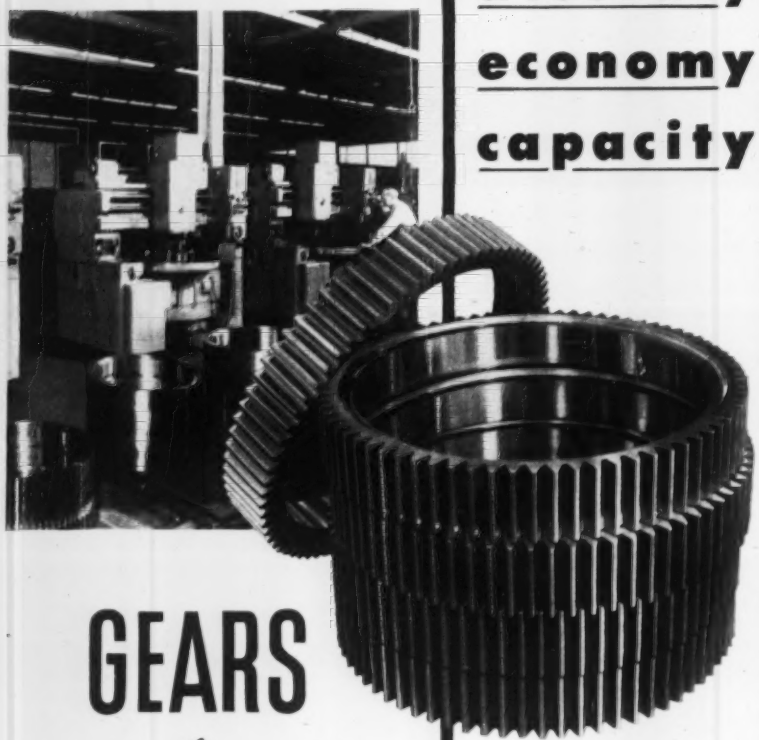
Mill backlogs include some deferred tonnage extending into March. The latter month now is expected to



Extensive Service Is Mark of Modern Warehouse

Modern steel warehouses that offer their customers slitting, shearing, pickling, flattening, flame-cutting and many other services are a far cry from the original concept of a warehouse. Symbolic of modern warehousing is this scene in the plate-burning department of Morris, Wheeler & Co., Philadelphia

● This picture shows a part of Fairfield's Spur Gear Cutting Department where finest, new equipment is used to produce gears up to 1½ pitch, 36" dia.



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MADE TO ORDER

AT FAIRFIELD, you get the benefit of mass production ECONOMY, combined with every modern facility for manufacturing FINE GEARS!

Here "under one roof" is everything needed to meet your most exacting gear requirements — metallurgical department, batteries of the most modern machines, testing laboratories, complete heat-treating facilities — all operated by skilled craftsmen working under expert engineering supervision.

Get acquainted with the Manufacturing Service Fairfield offers to makers of agricultural implements, road building machinery, machine tools, engines, trucks, tractors, and all kinds of powered equipment. *Your inquiry will receive prompt attention — ask for interesting, illustrated bulletin.*

SPUR GEARS — Straight, helical, and internal. Sizes from 16 pitch, 1½" dia., to 1½ pitch, 36" dia.

HERRINGBONE—(*Fellows Type*). Sizes from 1½" to 15".

SPIRAL BEVEL — Sizes from 16 pitch, 1½" dia., to 1½ pitch, 28" dia.

STRAIGHT BEVEL—Sizes from 16 pitch, 1½" dia., to 1½ pitch, 28" dia.

HYPOID—Sizes from 1½" to 28" dia.

ZEROL — Sizes from 16 pitch, 1½" dia., to 1½ pitch, 21" dia.

WORMS AND WORM GEARS—Worms to 7" dia. Worm gears to 36" dia.

SPLINED SHAFTS — Lengths to 52". Diameters from 1" to 6".

DIFFERENTIALS — 10,000 to 300,000 inch pounds capacity.

Note: All of the sizes above are approximate.

FAIRFIELD
MANUFACTURING CO.
2313 South Concord Road • Lafayette, Indiana

be the best booking month in first quarter with April operations higher.

Price confusion in cold-rolled carbon strip centers about 4.90c mill base, New Haven, Conn. Several mills are meeting this for delivery in certain areas while others are not.

Pittsburgh—Ordering is improving slowly, indicating consumers have trimmed inventories too close for comfort in some cases. February shipments will be disappointingly low unless sales to automakers pick up rapidly.

Pittsburgh Steel Co. announces its Allenport, Pa., cold-rolled sheet mill has full order books for March and April. The mill will start shipments in March.

St. Louis—Tempo of incoming sheet orders indicates present capacity production will not continue throughout first quarter. Although galvanized roofing sheet demand is holding up well, appliance makers' calls for fewer fractional horsepower motors has sharply reduced demand for electrical sheets.

Steel Bars . . .

Bar Prices, Page 148

New York—While no little of the bar tonnage scheduled to be rolled this quarter will represent deferments from the fourth quarter of last year, producers find encouragement in the fact this tonnage is being kept on mill books and is not being cancelled. There have been cancellations, of course, but few recently and, as indicated, a substantial amount of the tonnage held up last quarter is still wanted.

February rolling schedules may be a shade heavier than in January, despite the fact the former is the shorter month.

Boston—Demand for alloy bars is sluggish, volume being under that for carbon grades on which deliveries range two to three weeks with February schedules filling slowly. More stock tonnage is in sight for prompt shipment.

Several producers who have not been absorbing freight on hot-rolled carbon bars are now doing so. Most consumers are trying to avoid extras where possible.

Philadelphia—Bar demand remains light and disappointing, though slightly better than in the closing weeks of last year. Virtually all sizes and shapes, including alloy as well as carbon grades, hot and cold-drawn, can be had for early delivery without too much shopping around on the part of consumers.

Pittsburgh—Alloy bars are report-

STANDARDS and SPECIALS by the Millions

THE FERRY CAP & SET SCREW CO.

2159 SCRANTON ROAD • • • CLEVELAND 13, OHIO

"SHINYHEADS"

America's Best Looking Cap Screw

Made of high carbon steel — AISI C-1039 — to standards for Full Finished hexagon head cap screws — bright finish. Heads machined top and bottom. Hexagon faces clean cut, smooth and true, mirror finish. Tensile strength 90,000 p.s.i. Carried in stock.

"HI-CARBS"

Heat Treated Black Satin Finish

Made of high carbon steel — AISI C-1038. Furnished with black satin finish due to double heat treatment. Hexagon heads die made, not machined. Points machine turned; flat and chamfered. Tensile strength in accordance with SAE Grade 5. Carried in stock.

"LO-CARBS"

Made of AISI C-1018 steel — bright finish. For use where heat treatment is not required and where ordinary hexagon heads are satisfactory. Hexagon heads die made to size — not machined. Points machine turned. Tensile strength in accordance with SAE Grade 2. Carried in stock.

SET SCREWS

Square head and headless — cup point. Case hardened. Expertly made by the pioneers in producing Cup Point Set Screws by the cold upset process. Cup points machine turned. Carried in stock.

FILLISTER CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

FLAT HEAD CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

"SHINYLAND" STUDS

All studs made steam-tight on tap end unless otherwise specified, with flat and chamfered machined point. Nut end, oval point. Land between threads shiny, bright, mirror finish. Carried in stock.

*

CONNECTING ROD BOLTS

Made of alloy steel — heat treated — threads rolled or cut — finished to extremely close thread and body tolerances — body ground where specified. Expertly made by the pioneers in producing connecting rod bolts by the cold upset process.

ADJUSTING SCREWS

Valve tappet adjusting screws — Hexagon head style — to blue print specifications — hexagon head hard; polished if specified — threads soft to close tolerance — points machine turned; flat and chamfered.

*

SPRING BOLTS

Case hardened to proper depth and ground to close tolerances. Thread end annealed. Supplied in various head shapes, with oil holes and grooves of different kinds, and flats accurately milled.

FERRY PATENTED ACORN NUTS

For ornamental purposes. Steel insert — steel covered. Finish: plain, zinc plated, cadmium plated. Size: 9/16", 3/4", 15/16" across the flats.

Tapped 1/4" to 3/4" inclusive. Cross section of Ferry patented acorn nut, showing how steel hexagon nut fits snugly into shell.

Pioneers and Recognized Specialists, Cold Upset Screw Products since 1907

STANDARDS carried by LEADING DISTRIBUTORS

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SPECIALS furnished to BLUE PRINT SPECIFICATIONS

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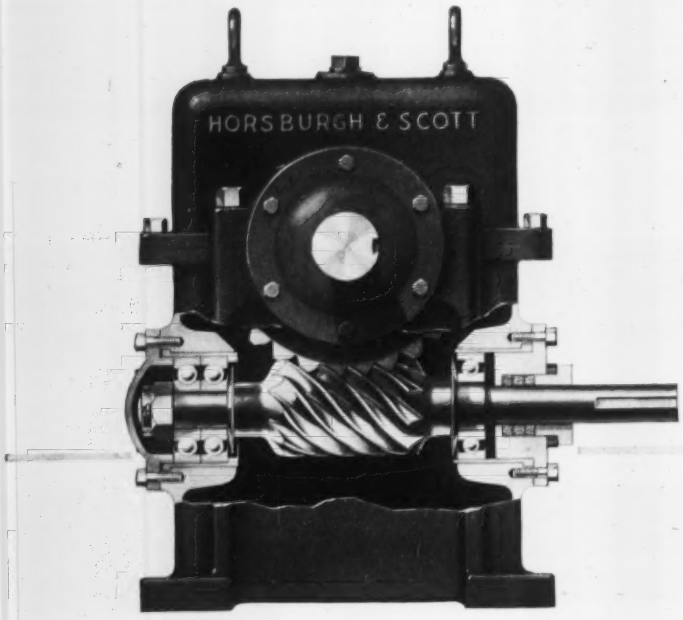

efficient, long life . . .

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by Horsburgh & Scott

Every modern element for reducing friction and other losses is incorporated in these reducers...hardened and accurately ground worm made from special case hardening steel, accurately made gear from chilled bronze to H & S specifications, anti-friction bearings, accurate alignment, smooth streamline interiors and proper lubrication. Due to its glass hardness, worm wear is nil...due to its accuracy, gear wear is negligible. Throughout their long life these reducers maintain their initial high efficiency.

10 ADVANTAGES

Extreme Simplicity	Extra Strength
Compactness	Low Maintenance
Efficiency	Oil-tight Housing
Long Life	Quiet Operation
Smooth Transmission	Wide Range of Ratios

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVE. • CLEVELAND 14, OHIO, U.S.A.

Send note on Company Letterhead for Speed Reducer Catalog 46

ed dormant, with no pickup from the slow start experienced this year.

In carbon bars some producers expect shipments to slip in February.

Cleveland—Bars continue to move sluggishly although demand is reported somewhat stronger. Consumers are ordering cautiously, largely for needs in sight. Mill bookings, however, are said to run four to six weeks ahead.

Chicago—Outlook for steel bars has picked up a little with prospects that the agricultural implement industry may be operating at somewhat higher level shortly.

Seattle—Bethlehem Pacific Coast Steel Corp. is now producing 4¾-inch rounds at its local plant. These are the largest ever rolled in a Pacific Northwest steel plant. More than 2200 tons of the new product have been ordered by the Pacific Car & Foundry Co. which is forging the rounds into electrode studs for the Canadian aluminum industry.

Plates . . .

Plate Prices, Page 148

Boston—While some plate fabricators have covered their needs through February mill schedules for that month are still open. Forward bookings vary from mill to mill. Plate sellers operating fabricating shops are doing relatively better on fabricated specialties than on plates.

Consumers' backlogs are not as extended, tanks and weldments included, but consumption is maintained fairly well.

Philadelphia—Plate producers see little improvement in immediate prospect. Consumer inventories are lighter and the spring building season is approaching, but whether these factors will have much bearing on February business remains to be seen.

Mills are hopeful that by March heavy miscellaneous construction, oil refinery work and fabricated pipe line expansion needs will contribute not only to improved business but improved rolling schedules.

Pittsburgh—A short term slowup in shipments is predicted for February. Construction companies are trimming their forward ordering, as plates continue to ease in supply.

Chicago—Steel plate fabricators are fairly well booked for the next four or five months and except for very heavy and wide plates and wide flange beams have no material supply problems.

Seattle—A labor dispute over a new union contract practically closed the smaller metalworking shops in

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You can be sure of highest quality high speed steels when you see the Crucible REX trademark . . . and their fine quality remains the same shipment after shipment.

Every piece of REX high speed steel responds uniformly to heat treatment, and gives maximum performance on the job. REX high speed steels possess the best possible combination of maximum red hardness and toughness. That's because Crucible maintains careful metallurgical checks on these steels throughout every step of manufacture. Each piece must measure up to highest quality standards.

It pays to specify REX when you order high speed steels . . . and remember, REX is made only by Crucible.

Stocks maintained of:

Rex High Speed Steel . . . ALL grades of Tool Steel (including Die Casting and Plastic Die Steel, Drill Rod, Tool Bits and Hollow Drill Steel) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . Max-el . . . AISI Alloy, Onyx Spring and Special Purpose Steels

CRUCIBLE first name in special purpose steels

54 *years of* Fine *steelmaking* **WAREHOUSE SERVICE**

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

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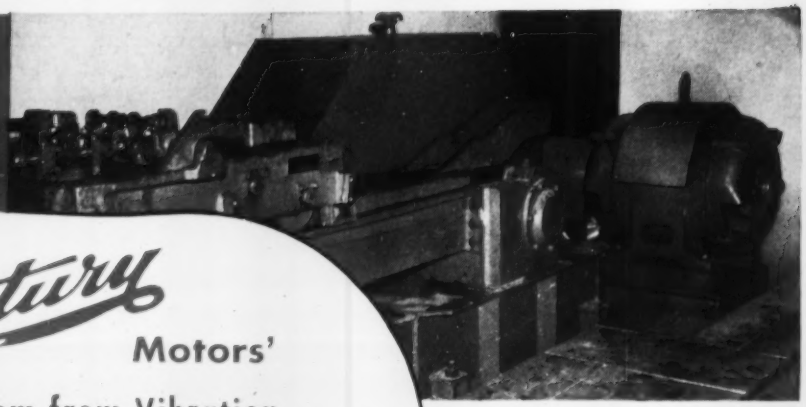


75 Horsepower Century drip proof motor on a copper tube drawing machine.

Century Motors'

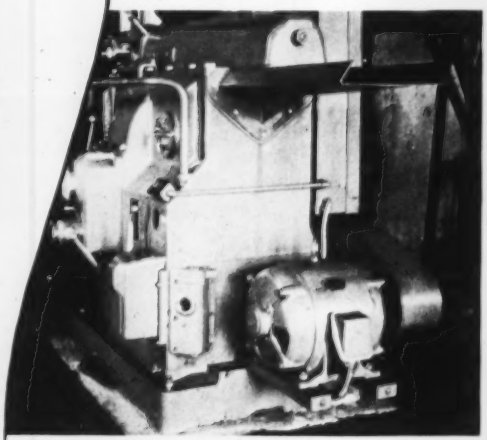
Unusual Freedom from Vibration Helps Maintain Close Tolerances— With a Minimum of Rejects

Century motors are designed to help you get the accuracy that was built into your modern production machines. They are ruggedly built, carefully machined and well balanced both mechanically and electrically. Century motors are widely known for their unusual freedom from vibration.

Century motors have wide acceptance from BIG NAME machine tool manufacturers because they mount squarely and solidly and operate with smooth, quiet precision.

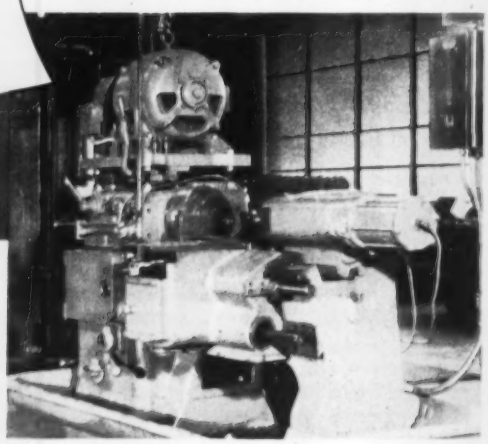
You may select Century motors in: open drip proof — splash proof — or totally enclosed fan cooled construction to assure uninterrupted production against various atmospheric hazards.

The complete line of Century motors permits selection of the right motor to meet the requirements of your machines. They are built in a wide range of sizes from 1/8 to 400 horsepower. Specify Century for all your equipment.



7½ Horsepower Century drip proof motor on a crank shaper in a tool room.

CENTURY ELECTRIC COMPANY
1806 Pine St., St. Louis 3, Missouri
Offices and Stock Points in Principal Cities



7½ Horsepower Century drip proof motor on a special production lathe.

Century SERVICE
Is Near Any CENTURY Motor Driven Equipment

Prompt Service is offered by CENTURY'S National Network of more than 200 Authorized Service Stations, supervised by 28 Century Sales offices.

1. Facilities for immediate exchange of most CENTURY standard ratings of standard construction are available at CENTURY Authorized Service Stations.
2. CENTURY Authorized Service Stations are qualified and equipped to service and repair any piece of CENTURY apparatus.
3. Genuine CENTURY renewal parts are available at CENTURY Service Stations, CENTURY Parts Distributors and at the factory in St. Louis.

Century C MOTORS

this area. Consequently, movement of plates is slow.

Stainless Steel . . .

Stainless Steel Prices, Page 152

Pittsburgh — Allegheny Ludlum Steel Corp. is developing a new grade of stainless steel suitable for structural and other use that does not depend upon cold rolling to develop its ultimate tensile strength, according to E. J. Hanley, president. Such an alloy, described as precipitation hardening, would find widespread use, he said, being particularly attractive for valves in the chemical industry, and might solve aircraft design problems.

Mr. Hanley, speaking to the New York Society of Security Analysts, also discussed the possibility of wider use of stainless in building and construction, and described the status of current research in the fields of high temperature superalloys for use in the highest performance jet engines.

Allegheny Ludlum has developed a new valve steel designed to meet high temperature conditions in automobile motors, and the new valve steel being made available to the aircraft industry is intended to solve problems of corrosion brought on by hotter valve operation.

Also, the company is expanding its facilities for production of fully finished grain-oriented silicon steel at its West Leechburg, Pa., plant.

Wire . . .

Wire Prices, Page 150

Chicago—Nail stocks are fairly high at manufacturing level but on the low side with dealers. The latter appear to be influenced by the former. Bale tie business should show improvement in 1954.

Boston—Heavier demand for merchant wire products and moderately improved buying by two automobile builders is not paced by miscellaneous industrial and fabricated wire goods orders. Manufacturing volume is spotty.

Pittsburgh—Fabricators are filling inventories of manufacturers wire. Stocks were low at yearend. Wiremakers, encouraged by the improving outlook, are scheduling slight production increases for February.

Seasonal improvements in merchant wire sales usually begin at this time as farmers install farm and poultry fence and barbed wire.

Cleveland—Some improvement in merchant wire demand is reported by sellers. This is a seasonal development with spring approaching, re-

World's largest stocks of

52100

STEEL TUBING and BARS

TUBES — Warehouse and mill shipment with more than 200 seamless tube sizes to choose from .950" O. D. to 8.750" O.D.

BARS — In sizes from .171" round to 8.750" round. Warehouse and mill shipment.

WIRE — Mill shipment of hot rolled or cold drawn ball, roller and needle wire.

FORGINGS — Quick shipment of all analyses.

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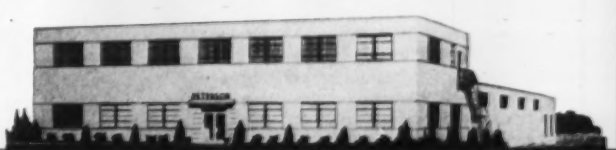
Contact our nearest office or write to Peterson Steels, Inc., Springfield Road, Union, New Jersey. Address: Dept. S.



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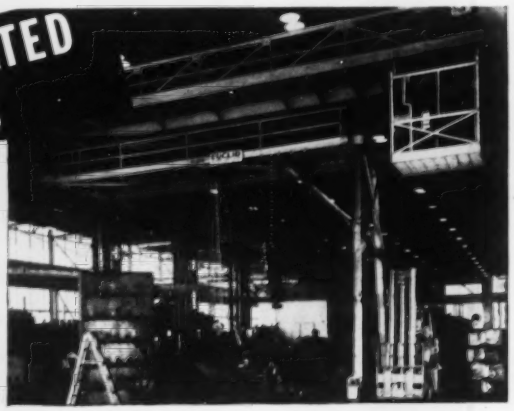
UNION, NEW JERSEY

Detroit, Michigan • Chicago, Illinois

CO-ORDINATED UNITS

in...

EUCLID Electric CRANES



Planned cooperation between material handling units can be a vital factor in speeding production and lowering cost.

Here, for example, is a Euclid half-gantry crane designed to cooperate with the larger Euclid overhead crane and lift trucks. The installation is in the assembly bay of a large steel fabricating plant.

Parts are brought in by the lift truck. Sub-assemblies are handled by the half-gantry crane. As the assembling operations progress the larger units are moved by the overhead crane and the completed machine finally carried to the testing department.

Think of cranes as production tools and ask our engineers to give you the benefit of their long experience in speeding production with overhead handling equipment. It will entail no obligation.

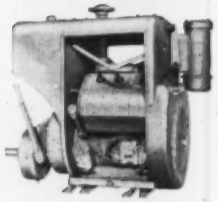
Euclid Cranes

The EUCLID CRANE & HOIST Co.
1365 CHARDON ROAD
EUCLID, OHIO

at rates up to 4 tons a minute...
Plow is WISCONSIN-Powered

Deep drifts "melt" in a hurry when this Bros Rotary Plow takes them down, layer by layer. Chute throws snow up to 50 ft., and can even be fitted with an extension for loading directly into trucks. Wm. Bros Boiler & Mfg. Co., Minneapolis is the builder of this efficient, Wisconsin-Powered unit.

While "snow removal" may have no relationship to your problem, this equipment nevertheless typifies the adaptability and versatility of Wisconsin Heavy-Duty Air-Cooled Engines to a great variety of applications. *There is a size to Fit the Machine and the Job,* in a complete power range from 3 to 36 hp., without power waste and with maximum Power Advantage. Specify "Wisconsin Power" for your equipment.



V-type 4-cylinder Wisconsin Air-Cooled Power Unit with Clutch Reduction.

MOST H.P. HOURS

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46, WISCONSIN

flecting the building up of merchant inventories in anticipation of farm requirements.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 148

Chicago — Inland Steel Co. announced new extras on new billet concrete reinforcing bars effective Jan. 22. These replace the schedule in effect since last May. Included in the changes are greater graduation of length extras and insertion of lift weight extras.

Seattle—District rolling mills are operating on reduced reinforcing bar backlogs.

Tin Plate . . .

Tin Plate Prices, Page 150

Washington — Shipments of metal cans during the first 11 months of last year amounted to 3,890,538 tons, against 3,585,431 tons in the corresponding period of 1952, an increase of about 9 per cent, according to the Bureau of Census, Department of Commerce.

November total was 315,095 tons, against 368,917 in October, a drop of 15 per cent. Food can shipments amounted to 190,967, against 239,111 in October, and non-food cans, 124,128 tons compared with 129,806 tons.

Tubular Goods . . .

Tubular Goods Prices, Page 151

Boston—Direct mill shipments of merchant steel pipe surpass stock sales with most distributors. Demand on the latter lags with prices 10 points off list in some cases. More tonnage is available from mill stocks for prompt shipment.

Freight absorption is general, but not excessive. The Morrisville, Pa., mill has a $2.35 freight advantage over the Baltimore district mill, delivered Boston. Comparison between Morrisville and Sparrows Point, however, is meaningless since the latter withdrew from the Boston area two years ago. Morrisville delivery is $1.68 per ton lower than Pittsburgh.

Pittsburgh—Producers of oil country goods expect their high levels of production to carry through second quarter.

Seamless tubular specialties are less active. Mechanical and pressure tubing production may decline in February, as incoming orders show no change.

Seattle—Spokane, Wash., opened bids last week for 500 tons of cast iron pipe. Portland, Oreg., has not yet awarded 350 tons on recent bidding. The pipe market in this area is slow.

Quantity
PRODUCTION
of
GREY IRON CASTINGS
ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES
ESTABLISHED 1866
THE WHELAND COMPANY
FOUNDRY DIVISION
MAIN OFFICE AND MANUFACTURING PLANTS
CHATTANOOGA 2, TENNESSEE

CURRENT FERROALLOY QUOTATIONS

Prices as reported to STEEL

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si), Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.
(16 to 19% Mn) $84 per ton, Palmerton, Pa; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $200, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; and Portland, Oreg.; add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $208 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 27.95c per lb of contained Mn, carload packed 28.7c, ton lots 29.8c, less ton 31.0c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max 0.50% C, and 4.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 36.2c per lb of metal; packed, 36.95c; ton lot 38.45c; less ton lots 40.45c. Delivered. Spot, add 2c.

Electromanganese: Carload, 31.5c; ton lots 33.5c; 250 to 1999 lb, 35.5c. Premium for hydrogen-removed metal, 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.4c per lb of alloy, carload packed, 12.15c, ton lots 13.05c, less ton 14.05c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%.) Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%) Contract, carload, lump, bulk, max. 0.025% C (Simplex) 34.50c per lb contained Cr, 0.03% C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High Carbon: (Cr 62-66%, C 5-7%) Contract, c.l. 8 M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8 M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 25.75c per lb of contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk 25.90c per pound of contained chromium plus 12.60c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Ferrochrome Silicon, No. 2: (Cr, 36-39%, Si 26-39%, Al 7-9%, C 0.05% max). 25.75c per lb of contained chrome plus 12.4c per lb of contained silicon plus aluminum 3" x down, delivered.

Chromium Metal: (Min 97% Cr and 1% Fe) contract, 1" x D; packed, max 0.50%, carload $1.12, ton lots $1.14; less ton $1.16. Delivered. Spot, add 5c Prices on 0.10 per cent carbon grade, add 4c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max, C 0.5-1% max). $3.10. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contact, carload, lump bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump bulk, 12.40c per lb of contained Si, carload packed 14.0c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.8c.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.0c per lb of contained Si, carload packed 18.2c, ton lot 19.15c, less ton 20.2c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 97% Si and 1% max Fe) C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max. 010% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy, ton lots packed 11.30c, 20 to 1999 lb 11.65c, smaller lots 12.15c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y. freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3% lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.25c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.45c per lb of briquet, c.l. packaged 13.25c, ton lot 14.05c, less ton 14.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.65c, per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.95c per lb of briquet. Packed c.l. 7.75c, ton lot 8.85c, less ton 9.45c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.1c. Packed c.l. 7.9c, ton lot 8.7c, less ton 9.6c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more, $3.80 per lb of contained W; 2000 lb W to 5000 lb W, $3.90; less than 2000 lb W, $4.02, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max. C 0.4% max.). Contract, ton lot, 2" x D, $6.40 per lb of contained Cb, less ton $6.45. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $4.75 per lb of contained Cb plus Ta, deld.; less ton lots $4.80.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%), Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr, 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 15c per lb of alloy; ton lots 16.50c; less ton lots 17.75c, f.o.b., Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 14.50c. Packed c.l. 15.50c, ton lots, 15.75c, less ton lots, 16.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, f.o.b. Langeloth, $1.32 in all sizes except powdered which is $1.41; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb. contained Mo, f.o.b. Langeloth, Pa., $1.14 in cans; in bags, $1.13, f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.

"We considered aluminum tube . . ."

"First of all, we wanted to save weight in this new product. We did it with aluminum.

"Second, we had a corrosion problem. That called for copper.

"And, third, we had to make our unit smaller. That meant we had to use a finned tube."

"That looks like a tough proposition. How did you make out?"

"Well, we found a product combining all three characteristics—called Wolverine Trufin*. They have one type—bi-metal—an integral finned aluminum tube with a choice of copper-base alloy liners. Now that we've tried it, we won't use anything else!"

"Just a minute. What do you mean—integral?"

"That means that the fins are part of the tube. They're extruded—literally squeezed—right out of the wall of the tube. Incidentally, because of the integral feature, the fins are unaffected by sudden temperature changes or vibration. And—remember—Trufin provides maximum heat transfer."

"Maybe we can use it too?"

"Probably. Wolverine has a Trufin data sheet which tells you all you need to know about sizes, fin heights and fin spacings. It tells you, too, about other types of Trufin—those made of all aluminum, all copper or all copper-base alloys, electric-welded steel or other metals."

Add it up: If you want to save space and weight—guard against corrosion from light hydrocarbons—boost efficiency and knock down the cost of your heat exchanger—the answer's at Wolverine. Write for data today!

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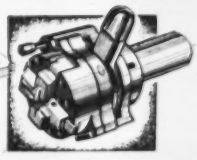

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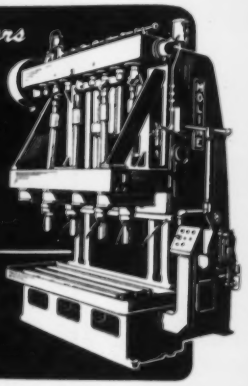

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No. HU68—Hydraulic rail feed universal joint type multiple spindle drilling machine.

ORES–COKE–REFRACTORIES

Prices as reported to STEEL; changes shown in italics.

ORES

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit deld. E. Pa.

Foundry and basic 56-62% concentrates contract 17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	22.00
North African hematite (spot)	20.00-22.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, before duty

Foreign Wolframite, min. 60%, WO_3	23.80
Domestic scheelite, mine	63.00

Manganese Ore

Mn, 48% nearby, $1.12 per long ton unit, c.i.f. U. S. ports, duty for buyers' account; 46-47%, $1.05-$1.07.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.:

Indian and African

48% 2.8:1	$40.00-$42.00
48% 3:1	44.00-46.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$24.00-$26.00
48% no ratio	34.00

Domestic
(Rail nearest seller)

48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb, Mb content, mines, unpacked $1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

50-60%	$2.40-$2.80
65% min.	$3.40-$3.50

Vanadium Ore

Cents per lb. V_2O_5 content, deld. mills

Domestic	31.00

REFRACTORIES

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $89; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $109; Salina, Pa., $114; Niles, O., $120; Los Angeles, Pittsburg, Calif., $132.30.

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $115; Warren, O., Hays, Pa., $120; Niles, O., $120; E. Chicago, Ind., Joliet, Rockdale, Ill., $125; Cutler, Utah, $116.55; Los Angeles, $122.85.

Insulating Fire Brick

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O., $77.50; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Perla, Ark., $109; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

Sleeves

Reesdale, Pa., $139.70; Johnstown, Pa., $140; Clearfield, Pa., $148.50; St. Louis, $151.80; Athens, Tex., $155.

Nozzles

Reesdale, Pa., $223.50; Johnstown, Pa., $229.20; Clearfield, Pa., $241.40; St. Louis, $247.10; Athens, Tex., $247.70.

Runners

Reesdale, Pa., $174; Johnstown, Pa., $177.80; Clearfield, Pa., $185.50; St. Louis, $187.30; Athens, Tex., $191.80.

High-Alumina Brick

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $179; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $223.00; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $225; Danville, Ill., $258; Clearfield, Pa., $252.

Dolomite

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Narlo, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $14.60, Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite

Domestic, deadburned bulk; Luning, Nev., $38.

METALLURGICAL COKE

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-15.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearney, N. J. ovens	$24.00
Everett, Mass., ovens	
New England, deld.	*26.00
Chicago ovens	24.50
Chicago, deld.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Chicago, deld.	28.12
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	23.95
Swedeland, Pa., ovens	23.85
St. Louis, ovens	
St. Louis deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, deld.	26.82
Detroit, ovens	25.50
Detroit, deld	26.50
Buffalo, deld.	28.08
Flint, deld.	28.23
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol	40.00
Toluol, one deg.	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Sulphate of ammonia	$44-47
Birmingham area	$45.00†

† With port equalization against imports.

Cents per pound, producing point

Phenol, 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

FLUORSPAR

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $44; 70%, $42.50; 60%, $38. Imported, net ton, duty paid, metallurgical grade, $35-$36.

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Inches Diam.	Length	Per 100 lb
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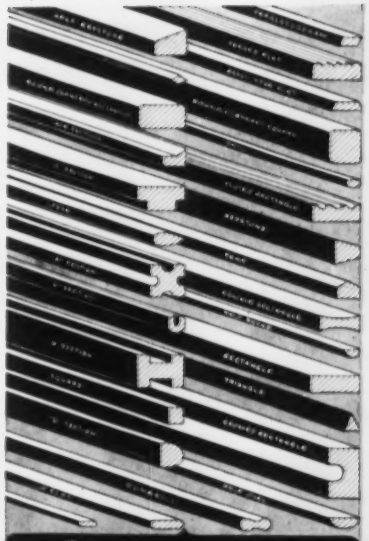
2½	30	28.00
3	40	27.25
4	40	26.00
5½	40	25.75
6	60	23.25
7, 8, 9, 10	60	21.00
12, 14	72	20.50
16	72	20.00
17	60	20.50
18	72	20.50
20	72	20.00
CARBON		
40	100	$8.95
40, 35, 30	110	8.95
30	84	9.10
24	96	8.90
24	72, 84	9.10
20	90	8.95
20	84	9.10
17	72	9.10
17	60	9.50
14	72	9.50
14, 12, 10	60	10.30
8	60	10.55



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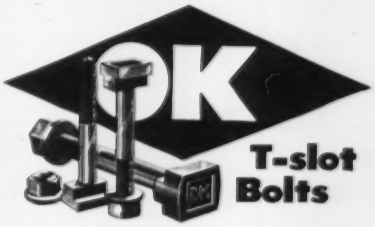

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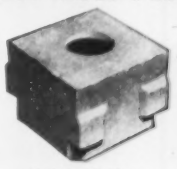

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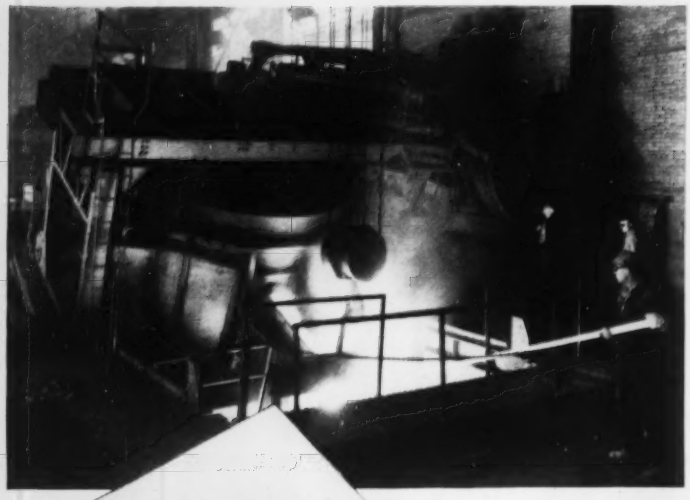

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69 illustrations **Price $5.00 Postpaid**

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Structural Shapes . . .

Structural Shape Prices, Page 148

New York—Structural steel shipments last year were the largest since record-breaking 1929, and bookings were the third largest since that year, reports the American Institute of Steel Construction.

Shipments totaled 3,117,711 tons, down only 190,000 tons from the peak year, and compared with 2,664,255 tons in 1952. Monthly shipments averaged 259,809 tons, with a high of 295,459 in October and a low of 230,304 in July.

Bookings amounted to 2,786,591 tons, and for the fourth consecutive year maintained an annual volume in excess of 2,500,000 tons. December bookings were 204,227 tons, against a revised figure of 153,514 for November. December shipments were 266,926 tons against a revised total of 257,844 in November.

By virtue of the heavy shipment rate throughout the year backlogs stood at 1,740,998 tons on Dec. 31, contrasted with 2,152,714 at the close of the previous year.

New York—Fairly diversified volume of structural work has been placed recently, including schools, bridges, hospital work, commercial construction and public building construction. Largest award in the immediate territory involves 2320 tons for the Lincoln tunnel expansion, projected by the Port of New York Authority.

Boston—Structural fabricating shops no longer worry as to standard structural tonnage. Mills have caught up on schedules and there is some easing in wide-flanged beams. Demand for the latter will be heavy well into this year.

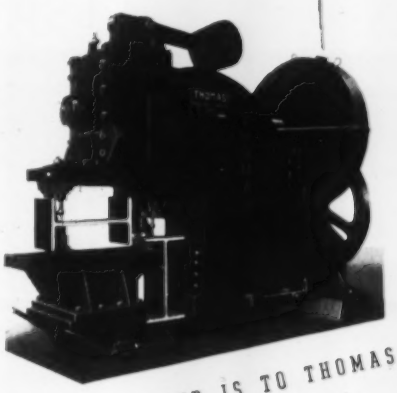
More structural tonnage is being estimated. Shop fabricating work for Maine turnpike bridges, exclusive of the Androscoggin span, will probably be let through three contracts, 16,325 tons being required in all.

Philadelphia—Structural market activity lags. Fabricators, however, are confident that as spring approaches business will quicken. Bridgework continues to loom ahead as the largest single potential. Meanwhile, most shops have sufficient backlogs to enable them to sustain a good rate of operations. Also, the Phoenixville, Pa., shape producer has started up two open hearths after having suspended ingot production several weeks.

Pittsburgh—A full schedule of construction projects continues to use all structural shapes the mills can produce.

American Bridge Division, U. S.

BEAM PUNCHING
without tool change



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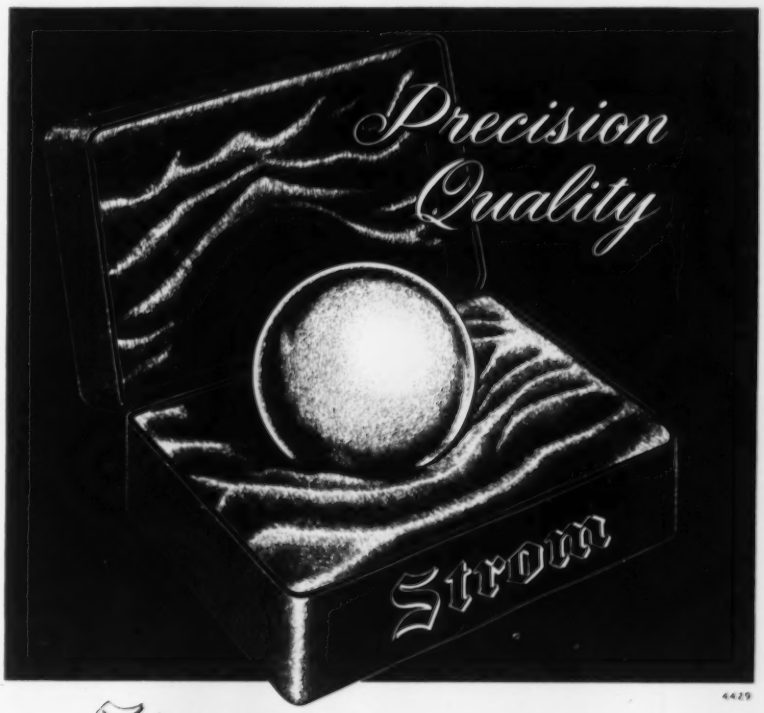

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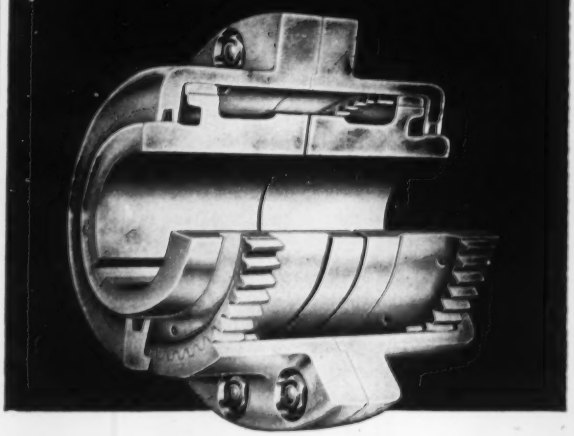

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STEEL can put you in touch with the important ones, those that do more than 92% of the industry's business. Tell the buyers and specifiers in these plants of the machines or materials you have for sale through an "Equipment—Materials" advertisement. For rates write STEEL, Penton Building, Cleveland 13, Ohio.

Steel Corp., is building 72 bridges for a 90-mile turnpike between Princeton, W. Va. and Charleston. Some 19,000 tons of structurals will be required.

Seattle—Winter weather slowed structural fabricating operations last week. Deliveries were hampered.

Pig Iron . . .

Pig Iron Prices, Page 152

Cleveland — While foundry operations have improved somewhat since opening of the new year not much pickup is reflected in merchant pig iron demand. Tonnage is moving sluggishly from the furnaces.

Some piling of iron is reported and there has been some curtailment in blast furnace operations recently.

Meanwhile, pig iron prices are holding unchanged. Although electric furnace slivery pig iron was reduced $3.50 per ton early in January, the price on blast furnace silvery pig iron continues unchanged.

Blast furnace operations in this immediate district have been further curtailed with Republic Steel taking off another stack Jan. 22. This leaves only 6 out of 10 furnaces in the area engaged.

New York — Pig iron movement here shows little change from the pre-holiday level. Some sellers doubt it is even being sustained and point out cancellations are still coming through and that the lag in foundry operations, first noticeable among the jobbing shops, is also in evidence at some captive foundries.

Foreign iron is being offered freely by several European countries. Some German basic, of good quality, has been offered as low as $42, delivered eastern Pennsylvania consuming plant. Off-grade material has been offered at substantially less.

Philadelphia — Except for pipe foundries, most gray iron shops are experiencing no gain in operations and this is reflected in a continued lag in demand for merchant pig iron, as is also a spotty situation in steel production, especially in the immediate area.

Pittsburgh—Ten of 54 blast furnaces in the Pittsburgh area are now closed down, with the shutting-down of No. 1 stack at National Tube Divisions' McKeesport, Pa., plant in early January. National Tube's stack will return to production this month following repairs to blooming mills at the plant.

Youngstown—Youngstown Sheet & Tube Co. has blown out two blast furnaces due to the letdown in business. The units are No. 1 stack at the Campbell Works, and the Hub-

1 man ... handles Sheet Steel Faster, Easier with a C-F LIFTER

C-F Lifters, under one man operation, pick up, carry and unload more sheet steel tonnage per hour than any other method – and at lower cost per ton. Wide carrying angles hold sheets securely – won't damage high grade sheets; tong action insures safe carrying; fast opening and closing adjustments of Lifter jaws permit shifting from one size pack to another in seconds. C-F Lifters are made in standard or semi-special models to handle from 2 to 60 tons.

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bard, O., furnace which ordinarily supplies hot metal to the Valley Mould & Iron Corp. plant.

Chicago—Pig iron producers are watching for signs which augur for increased consumption requirements. Farm machinery is offering a faint ray of hope. But automotive demand isn't what had been expected. Only 35 of the district's 43 blast furnaces are operating.

Iron Ore . . .

Iron Ore Prices, Page 167

Cleveland—Reflecting the slowing down in blast furnace operations, consumption of Lake Superior iron ore declined in December, reports the Lake Superior Iron Ore Association. Use during the month totaled 7,021,683 gross tons, comparing with 7,521,841 tons in November, and with 8,219,924 tons in December, 1952.

Total consumption of lake ore last year was 94,887,504 gross tons, comparing with 78,340,223 tons in 1952 during which year use was curtailed by the two-month strike during the summer.

On Jan. 1, 1954, 152 blast furnaces were operating in this country and 7 in Canada, leaving 39 idle in the U. S. and 6 in Canada. On Dec. 1, 1953, 30 U. S. and 6 Canadian stacks were on the idle list, while on Jan. 1, 1953, there were only 4 furnaces idle in this country and 2 in Canada.

Stocks of iron ore at furnaces and on Lake Erie docks on Jan. 1 totaled 48,815,444 gross tons. This compares with 54,981,324 tons a month earlier and with 45,171,753 tons on Jan. 1, 1953.

Scrap . . .

Scrap Prices, Page 174

Philadelphia—Scrap prices show further weakness. Major open-hearth items have been marked down $1 a ton and some other grades, notably machine shop turnings and mixed borings and turnings, as much as $2 a ton. These changes are largely nominal but reflect what sellers are willing to do business if business were offered.

It is considered possible in some quarters that any trading at these lower levels might not be readily duplicated. Prices are now reaching a point where yard collections are beginning to dry up and where producers of industrial scrap are disposed to hold on to their material on the chance there may be an upturn in the market. Momentarily, only one district mill is buying scrap, and that one on a limited basis.

Chicago—In a limited purchase, a mill here has bought No. 1 heavy melting of industrial origin and No. 1 factory bundles for February delivery at $28 and $29 respectively. This is a drop of $2 per ton. No. 1 heavy melting of dealer origin is now quotable at $26.

Boston—Steel scrap prices have lost ground, notably No. 2 heavy melting and bundles. One leading district consumer, paying $11 shipping point for short shoveling turnings in January, may shade that for February. Busheling sells close to No. 2 heavy melting with $15 top.

New York—Brokers continue to reduce buying prices on most grades of steel scrap. They are now offering $18 for No. 1 heavy melting and No. 1 bundles, $16 for No. 2 heavy melting and $14 for No. 2 bundles. However, there is practically no activity and in machine shop turnings and mixed borings and short turnings reductions are purely nominal at $8 to $9 and $11 to $12 respectively.

Unconfirmed reports are heard to the effect a local broker paid $15 for

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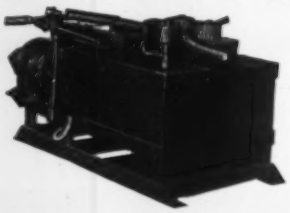

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Model "C" Capacity 1 1/4 inch
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Write for catalog of our complete line of reinforceing bar benders.

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No. 2 bundles for shipment abroad, ultimate destination being Japan.

Buffalo—Weak tendencies continue to dominate the scrap market with prices for steelmaking grades nominally unchanged.

Pittsburgh—Scrap market activity is restricted to small purchases. Dealers are reluctant to lower prices further, as a lower return might discourage collections. Steelmakers remain out of the market, with the last purchase of No. 1 heavy melting reported at $30.

Cleveland—The scrap market is marking time pending resumption of active buying by the mills. Prices on steelmaking grades are weaker on a reported sale of a small tonnage to a Valley mill $2 under the recognized market.

Generally, it is felt the market is close to bottom, though some trade interests would not be surprised if further declines developed in event a substantial mill buy were negotiated. Cast grades are stronger.

Detroit—Further price decline in scrap is expected over the immediate future. No reversal in the market trend is seen until spring.

Cincinnati—Some local buying is reported with the result a few prices have moved to new levels. In the case of low phosphorous and rails, 18 inch, prices declined $1 a ton from the previous nominal quotations. Buying pushed the nominal prices on charging box cast and heavy breakable cast down $2 a ton to $32. Malleable fell $3 a ton, while No. 1 railroad heavy melting rose $1 a ton.

St. Louis—Scrap prices have drifted lower, with most quotations nominal. The sole rosy spot on the brokers' horizon is the fact railroad prices are softening only moderately under heavy offerings.

Los Angeles—With the mills continuing out of the market, scrap prices are unchanged but they are nominal. Dealers fear that when the mills renew interest in purchasing, prices will fall another $3 per ton.

San Francisco—With local demand slow, steel scrap dealers are casting about for foreign shipments.

Seattle—Scrap demand is sluggish. Stocks are heavy. The larger users are temporarily out of the market.

Hyman-Michaels Co. is dismantling the Port Angeles & Western railroad on the Olympic Peninsula under sub-contract.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

4800 tons, 15 multiple purpose hangars, air field base, Westover Field, Chicopee, Mass., to Lehigh Structural Steel Co., Allenton, Pa.; T. C. Bateson Co., Dallas, Tex., general contractor.

2340 tons, comprising two contracts for American Gas & Electric Service Corp., to R. C. Mahon Co., Detroit; one contract involves 1122 tons for work at Madison, Ind., and the other 1226 tons for work at Cheshire, O.

2329 tons, section, Lincoln tunnel, Port of New York Authority, New York city, to Bethlehem Steel Co., Bethlehem, Pa.

1250 tons, four-span truss bridge, Housatonic river, Brookfield-Bridgewater, Mass., to Lehigh Structural Steel Co., Allentown, Pa.; Mariani Construction Co., New Haven, Conn., general contractor; previously reported as going to another shop.

1200 tons, Phelps Memorial Hospital, Mt. Pleasant, N. Y., to Grand Iron Works, Bronx, New York city.

1165 tons, towers, for the American Telephone & Telegraph Co., for erection in Mississippi, Louisiana and Texas, to Lehigh Structural Steel Co., Allentown, Pa.; work divided into two contracts, one involving 365 tons and the other 800 tons.

935 tons, boiler supports, Foster Wheeler Corp., Martins Creek, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

850 tons, service building, Rike Kumler Co., Dayton, O., through Abbott, Mert & Co., to Bethlehem Steel Co., Bethlehem, Pa.

645 tons, municipal welfare center building, Brooklyn, N. Y., through Psaty & Fuhrman Inc., general contractor, to Bethlehem Fabricators, Bethlehem, Pa.

615 tons, senior high school, Oceanside, Long Island, through Leon D. DeMatteis Construction Co., general contractor, to Simon Holland & Son Inc., Brooklyn, N. Y.

600 tons, steel piling, temporary railroad trestle, Winchester, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Berke-Moore Co., Boston, general contractor.

290 tons, warehouse, Art Steel Co., Bronx, New York city, to Bethlehem Steel Co., Bethlehem, Pa.

215 tons, public school No. 259, Brooklyn, N. Y., through John Rosenbaum, general

(*Please Turn to Page* 176)

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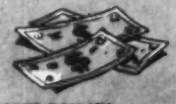

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IRON AND STEEL SCRAP

Consumer prices, per gross ton, except as otherwise noted, including broker's commision, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Jan. 28	$28.17
Jan. 21	29.17
Dec. Avg.	32.10
Jan. 1953	43.00
Jan. 1949	41.54

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	*26.00-27.00*
No. 1 bundles	30.00-31.00
No. 2 bundles	25.00-26.00
No. 1 busheling	30.00-31.00
Machine shop turnings	16.00-17.00
Mixed borings, turnings	17.00-18.00
Short shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Cut structurals	36.00-37.00
Heavy turnings	30.00-31.00
Punchings & plate scrap	34.00-35.00
Electric furnace bundles	34.00-35.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Charging box cast	34.00-35.00
Heavy breakable cast	32.00-33.00
Unstripped motor blocks	24.00-25.00
No. 1 machinery cast	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt	31.50-32.50
Rails, 2-ft. and under	46.00-47.00
Rails, 18-in. and under	47.00-48.00
Rails, random lengths	39.00-40.00
Railroad specialties	34.00-35.00

Stainless Steel Scrap
(F.o.b. shipping point)

18-8 bundles & solids	165.00-170.00
18-8 turnings	85.00-90.00
430 bundles & solids	85.00-87.00
430 turnings	60.00-62.00

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	28.00-29.00
No. 2 bundles	23.00-24.00
No. 1 busheling	28.00-29.00
Machine shop turnings	14.00-15.00
Mixed borings, turnings	18.00-19.00
Short shovel turnings	18.00-19.00
Cast iron borings	18.00-19.00
Low phos.	30.00-31.00
Alloy free, short shovel turnings	21.00-22.00
Electric furnace bundles	30.00-31.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Charging box cast	29.00-30.00
Stove plate	36.00-37.00
Heavy breakable cast	25.00-26.00
Unstripped motor blocks	24.00-25.00
Brake shoes	33.00-34.00
Clean auto cast	43.00-44.00
No. 1 wheels	39.00-40.00
Burnt cast	30.50-31.50
Drop broken machinery	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt	30.00-31.00
R.R. malleable	42.00-43.00
Rails, 3-ft. and under	43.00-44.00
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	38.00-39.00
Cast steel	35.00-36.00
Railroad specialties	35.00-36.00
Uncut tires	37.00-38.00
Angles, splice bars	41.00-42.00
Rails, rerolling	42.00-43.00

Stainless Steel
(F.o.b. shipping point)

18-8 bundles, solids	nom. 160.00-170.00
18-8 turnings	nom. 70.00-80.00
430 clips, bundles, solids	nom. 70.00
430 turnings	nom. 50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	29.00-30.00
No. 2 bundles	27.00-28.00
Machine shop turnings	15.00-16.00
Short shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	31.00-32.00
Electric furnace bundles	31.00-32.00

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	*27.00*
No. 2 heavy melting	*24.00*
No. 1 bundles	*27.00*
No. 2 bundles	*22.00*
No. 1 busheling	*27.00*
Electric furnace bundles	30.00
Machine shop turnings	*15.00-16.00*
Mixed borings, turnings	*17.00-18.00*
Short shovel turnings	*21.00*
Structurals & plate	*31.00-32.00*
Heavy turnings	*25.00*
Couplers, spring, wheels	*33.00-34.00*
Rail crops, 2 ft & under	*42.00*

Cast Iron Grades

No. 1 cupola	33.00-35.00
Heavy breakable cast	34.00-35.00
Unstripped motor blocks	28.00
Drop broken machinery	40.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*18.00*
No. 2 heavy melting	*16.00*
No. 1 bundles	*18.00*
No. 2 bundles	*14.00*
Mach. shop turnings nom	*8.00-9.00*
Mixed borings, short turnings nom.	*11.00-12.00*
Low phos. (structural & plate)	26.00-27.00
Short shovel turnings	*12.00-13.00*

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unstripped motor blocks	21.00-22.00

Stainless Steel

18-8 sheets, clips, solids	160.00-165.00
18-8 borings, turnings	85.00-90.00
430 sheets, clips, solids	75.00-80.00
410 sheets, clips, solids	65.00-70.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	17.25-18.25
No. 2 heavy melting	*14.00-14.50*
No. 1 bundles	*16.00-16.50*
No. 2 bundles	*12.00-12.50*
Machine shop turnings	5.50-6.00
Mixed borings, turnings	7.00-7.50
Short shovel turnings	*10.00-11.00*
No. 1 cast	29.00-30.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast	36.00-37.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*25.00-26.00*
No. 2 heavy melting	*22.00-23.00*
No. 1 bundles	*25.00-26.00*
No. 2 bundles	*19.00-20.00*
No. 1 busheling	*25.00-26.00*
Machine shop turnings	11.00-12.00
Mixed borings, turnings	14.00-15.00
Short shovel turnings	14.00-15.00
Cast iron borings	14.00-15.00
Low phos., 18-in.	*33.00-34.00*

Cast Iron Grades

No. 1 cupola	37.00
Heavy breakable cast	*32.00*
Charging box cast	*32.00*
Drop broken machinery	44.00

Railroad Scrap

No. 1 R.R., heavy melt	*29.00-30.00*
Malleable	*32.00-33.00*
Rails, 18-in and under	*43.00-44.00*
Rails, random lengths	36.00-37.00

CHICAGO

No. 1 heavy melting	*26.00-28.00*
No. 2 heavy melting	23.00-24.00
No. 1 factory bundles	*27.00-29.00*
No. 1 dealer bundles	27.00-28.00
No. 2 bundles	21.00-23.00
No. 1 busheling	28.00-30.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	11.00-12.00
Short shovel turnings	13.00-14.00
Cast iron borings	13.00-14.00
Cut structurals, 3-ft	32.00-33.00
Punchings & plate scrap	33.00-34.00
Electric furnace bundles	31.00-32.00

Cast Iron Grades

No. 1 cupola	32.00-33.00
Stove plate	26.00-27.00
Unstripped motor blocks	19.00-20.00
Clean auto cast	36.00-37.00
Drop broken machinery	36.00-37.00

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00
R.R. malleable	39.00-40.00
Rails, 2-ft. and under	43.00-44.00
Rails, 18-in. and under	44.00-45.00
Angles, splice bars	38.00-39.00
Rails, rerolling	37.00-39.00

Stainless Steel Scrap

18-8 clips & solids	130.00-140.00
18-8 turnings	60.00
430 clips & solids	52.50
430 turnings	nom. 25.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*21.00*
No. 2 heavy melting	*17.50*
No. 1 bundles	*22.00*
No. 2 bundles	*17.50*
No. 1 busheling	*21.00*
Machine shop turnings	*8.00*
Mixed borings, turnings	*8.00*
Short shovel turnings	*10.50*
Punchings & plate scrap	24.00

Cast Iron Grades

No. 1 cupola	35.00
Charging box cast	26.00
Stove plate	28.00
Heavy breakable	25.00
Unstripped motor blocks	18.00
Clean auto cast	40.00
Malleable	30.00

BUFFALO

No. 1 heavy melting	24.50-25.50
No. 2 heavy melting	21.50-22.00
No. 1 bundles	24.50-25.50
No. 2 bundles	19.50-20.00
No. 1 busheling	24.50-25.50
Machine shop turnings	12.00-13.00
Mixed borings, turnings	14.00-14.50
Short shovel turnings	15.00-15.50
Cast iron borings	14.00-14.50
Low phos.	28.50-29.50

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	27.50-28.50
No. 1 machinery	32.50-33.50

Railroad Scrap

Rails, random lengths	31.50-32.50
Rails, 2 ft and under	36.50-37.50
Railroad specialties	34.50-35.50

BIRMINGHAM

No. 1 heavy melting	26.00-26.50
No. 2 heavy melting	24.00-24.50
No. 1 bundles	26.00-26.50
No. 2 bundles	22.00-22.50
Cast iron borings	17.00-18.00
Short shovel turnings	17.00-18.00
Machine shop turnings	19.00
Cut structurals	nom.
Electric furnace bundles	nom.

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	41.00-42.50
Charging box cast	30.00-31.00
Stove plate	38.00-39.00
Bar crops and plate	31.00-32.00
Plate and structurals	31.00-32.00
Heavy breakable cast	30.00-31.00
Unstripped motor blocks	34.00-35.00
No. 1 wheels	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	nom.
Rails, 2-ft. and under	42.00-43.00
Rails, random lengths	39.00-40.00
Angles, splice bars	38.00-39.00
Rails, rerolling	46.00-47.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	27.00
No. 2 heavy melting	25.00
No. 1 bundles	27.00
No. 2 bundles	22.00
Machine shop turnings	*11.00*
Short shovel turnings	12.00

Cast Iron Grades

No. 1 cupola	37.00
Charging box cast	*25.00*
Heavy breakable cast	*25.00*
Unstripped motor blocks	*25.00*
Brake shoes	36.00
Clean auto cast	37.00
Burnt cast	26.00

Railroad Scrap

No. 1 R.R. heavy melt.	*30.00-31.00*
Rails 18-in. and under	*42.00*
Rails, random lengths	*35.00*
Rails, rerolling	*37.00-38.00*
Uncut tires	30.00-31.00
Angles, splice bars	*33.00-34.00*

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	27.00
No. 2 heavy melting	23.00
No. 1 bundles	24.00
No. 2 bundles	19.00
No. 3 bundles	15.00
Machine shop turnings	12.00
Mixed borings, turnings	12.00
Short shovel turnings	12.00
Electric furnace, No. 1	36.00-38.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	35.00-37.00
Heavy breakable cast	25.00-32.00
Unstripped motor blocks	23.00
No. 1 wheels	38.00-40.00
Stove plate	29.00

Railroad Scrap
(Delivered consumer plant)

Rails, random lengths	30.00-34.00

SAN FRANCISCO

No. 1 heavy melting	23.00
No. 2 heavy melting	19.00
No. 1 bundles	22.00
No. 2 bundles	19.00
No. 1 busheling	24.00
Machine shop turnings	7.00
Mixed borings, turnings	7.00
Short shovel turnings	11.00
Cast iron borings	11.00
Cut structurals	28.00
Heavy turnings	11.00
Punchings & plate scrap	28.00
Electric furnace bundles	22.00

Cast Iron Grades

No. 1 cupola	39.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	29.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	43.00

LOS ANGELES

No. 1 heavy melting	23.00
No. 2 heavy melting	19.00
No. 1 bundles	22.00
No. 2 bundles	19.00
Machine shop turnings	7.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	40.00-41.00

HAMILTON, ONT.

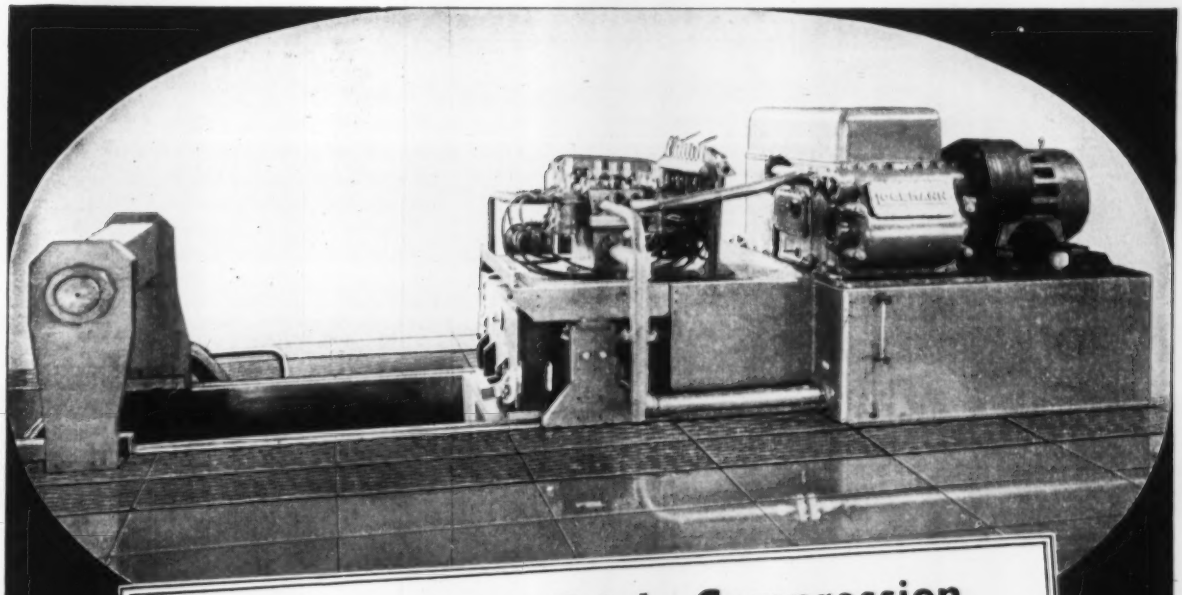
(Delivered prices)

No. 1 heavy melting	$29.00
No. 2 heavy melting	26.00
No. 1 bundles	29.00
No. 2 bundles	24.00
Mixed steel scrap	23.00
Mixed borings, turnings	17.00
Rails, remelting	38.95
Busheling new factory:	
Prepared	27.00
Unprepared	23.00
Short steel turnings	17.00

Cast Iron Grades†

No. 1 machinery cast	43.00

†F.o.b., shipping point.



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Also available are various sizes and types of pumps and operating valves to meet output requirements. Logemann Scrap Presses can be equipped with loading hopper in which the scrap charge can be prepared while the press is going through the operations on the preceding bale. Compressed bales are delivered at floor level for ejection to conveyor, steel chute, or into accumulation pit.

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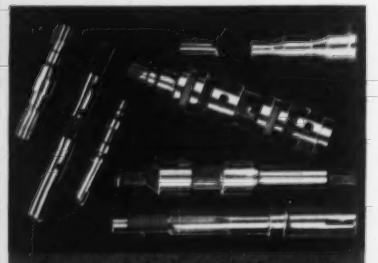

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STEEL PRODUCTS INC.
Grand Haven
Michigan

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contractor, to Schacht Steel Construction Inc., New York city.

200 tons, store, J. C. Penney, Philadelphia to Gray's Metal Co., that city.

178 tons, elementary school, Babylon, Long Island, N. Y., through Fisher-Malik Inc., general contractor, to Mineola Steel Fabricators Inc., Mineola, Long Island, N. Y.

100 tons, Oregon Ave. marketing center, Philadelphia, to Max Corchren & Son, that city.

STRUCTURAL STEEL PENDING

800 tons, library, St. Johns University, Hillcrest, Queens, Long Island, N. Y., bids asked.

500 tons, shop, Philadelphia Electric Co., Philadelphia, Wark & Co., that city, general contractors.

400 tons, convent, Lady of Cenacle, Mt. Kisco, N. Y., bids Feb. 4.

350 tons, plant addition, Monsanto Chemical Co., Springfield, Mass.; bids in for general contract.

225 tons, Chester township school, Paoli, Pa., bids asked.

100 tons or more, 100-ton gantry crane for The Dalles dam; Pacific Coast Engineering Co., Alameda, Calif., low $338,500 to U. S. Engineer, Portland, Oreg.

100 tons, deadend yoke assembly, Schmitt Steel Co., Portland, Oreg., low $26,035, to Bonneville Power Administration, Portland, Oreg.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2200 tons, 4½-inch rounds to Bethlehem Pacific Coast Steel Corp., Seattle, for electrode studs to be fabricated by Pacific Car & Foundry Co., Seattle.

500 tons, store building, J. C. Penney Co., Jacksonville, Fla., to Florida Steel Products, Inc., Jacksonville; J. A. Jones Construction Co., Charlotte, N. C., general contractor.

100 tons, state highway work, to Northwest Steel Rolling Mills Inc., Seattle; Henry Hagman, Cashmere, Wash., general contractor.

PLATES . . .

PLATES PLACED

200 tons, digesters, Great Northern Paper Co., Millinocket, Me., to Bethlehem Steel Co., Fore River, Quincy, Mass., shipyard.

PLATES PENDING

130 tons, also 30 tons of reinforcing, welded penstock for Centralia, Wash., power plant addition; Hall-Atwater Co., Seattle, low $99,500.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Chicago & Northwestern, 37 diesel locomotives, fifteen 1750-hp road switchers and two 600-hp yard switchers to the Electro-Motive Div., General Motors Corp., La Grange, Ill.; ten 1600-hp road switchers to Fairbanks-Morse & Co., Chicago; seven 1600-hp road switchers to the American Locomotive Co., New York; three 1200-hp yard switchers to the Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

National of Mexico, 15 diesel units, to the Montreal Locomotive Works, Montreal, Canada; list comprises twelve 1600-hp passenger units and three 1000-hp switching units.

RAILROAD CARS PLACED

Atlanta & St. Andrews Bay, 26 fifty-ton pulpwood cars, to its own shops.

Chicago & Northwestern, 1030 box cars and 25 caboose cars, placed as follows: One thousand 40½-foot box cars to Pullman-Standard Car Mfg. Co., Chicago, and thirty 50½-foot box cars to the American Car & Foundry Co., New York, and 25 caboose cars to the International Railway Car Co., Buffalo.

Lehigh Valley, 100 seventy-ton covered hopper cars and one 125-ton depressed center flat cars, to its own shops.

Union Tank Car Co., 850 fifty-ton tank cars to its own shops.

RAILROAD EQUIPMENT—*FOR SALE*

USED AS IS RECONDITIONED

STANDARD GAUGE FREIGHT CARS

Box, Steel Sheathed, 40-Ton Capacity

Box, Double Sheathed, 50-Ton Capacity

Box, Single Sheathed, 50-Ton Capacity

Flat, 50-Ton, Steel Underframe, 40'6" Long

Gondolas, Composite, or All Steel 50-Ton and 70-Ton

Hoppers, Twin, All-Steel, 50-Ton, Cross Dump

Ore Hoppers, All-Steel, 50-Ton, Heavy Duty

Tank, 3,000-Gallon, High Pressure

Tank, 8,000-Gallon, Coiled and Non-Coiled

Hoppers, All Steel, 70-ton, Triple Hopper Cross Dump

CABOOSE CARS

Eight Wheel, Cupola Type

AUSTIN-WESTERN 30-YARD AIR DUMP CARS; STANDARD GAUGE; 50-TON, SIDE DUMP, DROP DOOR

OTHER EQUIPMENT

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Locomotive Cranes — Railroad Track Scales

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100-TON, 600 H.P., TYPE 0-4-4-0

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PLANT OR PRODUCTION MANAGER. Experience covers all phases of plant operation and control, including, costs, methods improvement, incentives and labor relations. M.I.T. graduate. Reply Box 868, STEEL, Penton Bldg., Cleveland 13, Ohio.

PLANT MANAGER—20 years' experience in Plant Management, Production Control, Manufacturing Development. Could invest. Age 45, married, family. Reply Box 890, STEEL, Penton Building, Cleveland 13, Ohio.

Help Wanted

FABRICATED STRUCTURAL STEEL SALESMAN and ESTIMATOR familiar with Metropolitan New York building contractors. Give complete qualifications and state salary expected. Reply Box 907, STEEL, 60 East 42nd St., New York 17, N. Y.

POSITIONS VACANT CLASSIFICATION
Structural Engineer and Detailer, Formal Education and Degree desirable but not required. 4 years' experience detailing absolutely essential. Shop and estimating experience helpful. Small shop in middle west doing light structural, miscellaneous and reinforcing. We are looking for top man who has reached a block in his present position and has capabilities of eventually assuming complete responsibilities. Reply Box No. 905, STEEL, Penton Building, Cleveland 13, Ohio.

Employment Service

SALARIED POSITIONS $5,000 to $35,000. We offer the original personal employment service (established 44 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars. R. W. BIXBY, INC., 665 Brisbane Bldg., Buffalo 3, N. Y.

Accounts Wanted

KINDRED ACCOUNTS WANTED
Successful Sales Organization in Western New York, warehouse distributors and sales agents of bronze, steel and cast iron products, now desires additional kindred accounts. Our experienced and technical sales force can sell your product in this area. Reply Box 902, STEEL, Penton Building, Cleveland 13, Ohio.

GENERAL SUPERINTENDENT

Midwest steel plate fabricator including storage tanks and pressure vessels offers excellent opportunity to man qualified by experience to supervise production, scheduling, engineering and plant maintenance. Give full details as to qualifications, experience and salary required. Replies strictly confidential. Reply Box 906, STEEL, Penton Building, Cleveland 13, Ohio.

INDUSTRIAL SALES OPPORTUNITY

Manufacturer of nationally advertised industrial parts cleaning equipment seeks financially responsible firm to handle complete line in Southwestern territory. Attractive commission arrangement. Send complete resume of qualifications and experience. Interview arranged at your convenience. Write Box 909, STEEL, Penton Building, Cleveland 13, Ohio.

CRANE DESIGN ENGINEER

Graduate engineer experienced in design and construction wanted to assume charge of engineering department of overhead traveling crane manufacturer. Must have executive ability. Give full details of experience, salary requirements, etc.

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10 Ga. galv. riveted shipping containers, 33" high by 24" dia. with water tight rubber gasket sealed removable lid. Jaybolt fastened, weight 127 #. Can be used for transportation of chemicals, paints, solvents, metal parts. They are galv., painted Alum., inside and outside. In excellent condition.

Orig. Cost—$40.00 ea.
Our price:—$10.00 ea.
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Machine Screw Corp.
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Makers of H & G Die Heads

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Take advantage of our more than 40 years' experience in manufacturing and re-building industrial transformers. Complete satisfaction guaranteed.

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"TRANSFORMER HEADQUARTERS"
Manufactured – Bought – Sold – Repaired
THE ELECTRIC SERVICE CO., INC.
5315 Hetzel St., Cincinnati 27, Ohio

Large or small jobs—

PANGBORN BLAST CLEANING

cuts maintenance cost and time!

Pangborn Blast Cleaning Machine—Cleans tanks, bridges, buildings, and other structures quickly and economically. Ideal for maintenance and other jobs, such as removal of dirt, scale, rust, etc. preparatory to painting. Six sizes, stationary or portable, from . . . **$188** and up.

Pangborn Blast Cabinet—Saves time and money in cleaning small metal parts . . . removing rust, scale, grime, old paint, etc. Produces smooth, clean surfaces on pieces up to 60" x 35" in size. Models from . . . **$319** and up.

Pangborn Unit Dust Collectors—Trap dust at the source. Minimize maintenance, allow reclamation of valuable material . . . **$286** and up.

Pangborn Hydro-Finish Cabinets—Remove directional grinding lines, hold tolerances to .0001". Reduce further finishing of tools, molds, dies . . . **$1410** and up.

Write for details on these machines to: PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md.

Look to Pangborn for the latest developments in Blast Cleaning and Dust Control equipment.

Pangborn

BLAST CLEANS CHEAPER

with the right equipment for every job

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TYPE EV SPEEDRANGERS are electronically-controlled, Thyraton type, adjustable-speed power drives with a wide range of operating speeds and good speed regulation.

SIZES. ⅛ to 1½ HP with basic speed of 2400 RPM.

SPEED RANGE. Drive speeds are adjustable down to one sixth of the basic speed for continuous duty, 50°C.; down to one twentieth of the basic speed, intermittent duty.

HOW IT WORKS. Single phase AC power is converted by Thyraton type electronic rectifiers to supply a DC variable-speed drive motor. This DC drive motor is of the separately excited type, which inherently has good speed regulation.

STANDARD CHARACTERISTICS are constant torque rating over the full speed range . . . complete control from a compact operator's station . . . infinite steps of speed adjustment . . . smooth starting and good speed regulation.

OPTIONAL FEATURES are jogging, reversing, dynamic braking, wide or special speed ranges and special duty cycles.

New

electronic variable speed drives

TYPE GV SPEEDRANGERS are electronically-controlled, motor-generator type, adjustable-speed power drives with a wide range of operating speeds and good speed regulation.

SIZES. 2 to 10 HP with basic speeds of 2400, 1750 and 1150 RPM.

SPEED RANGE. Drive speeds are adustable down to one sixth of the basic speed for continuous duty, 50°C.; down to one tenth of basic speed intermittent duty.

HOW IT WORKS. Three or two phase AC power is converted by a motor-generator set and by tube type electronic rectifiers to supply a DC variable-speed drive motor. This DC drive motor is of the separately excited type, which inherently has good speed regulation.

OPERATION. The Type GV Speedrangers have the same standard characteristics and optional features as listed above for the Type EV Speedrangers.

MANY TYPES. The DC drive motor for both the Type EV and GV Speedrangers are available with Master Unibrakes, Fluid Drives and any of the five types of Master Gearmotors.

THE MASTER ELECTRIC COMPANY
DAYTON, OHIO

Takes the shock around the clock with TIMKEN® bearings on the axles

WHEN tons of steel pour into the molds on these ingot cars, terrific shock loads hit the bearings. Bouncing over rough track also puts shock loads on the bearings. That's why the axles of all the ingot cars in this large Eastern steel mill roll on Timken® tapered roller bearings.

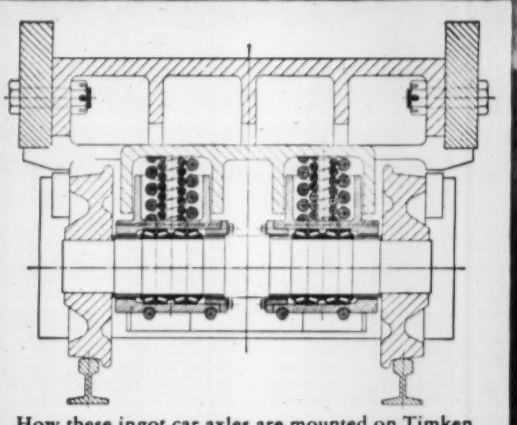
Because case-hardened Timken bearings have tough, shock-resistant cores, they take the shock loads easily, keep the cars ready to roll at any time.

Less hauling power is needed to start the cars, too. Timken bearings' true rolling motion and extremely smooth surface finish practically eliminate friction, cutting starting resistance 88%.

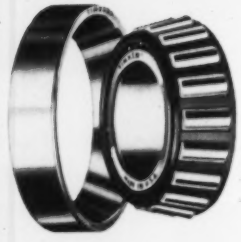
With Timken bearings on the job, the problem of worn-out thrust washers no longer worries mill operators. The tapered construction of Timken bearings takes both radial and thrust loads in *any* combination. No auxiliary thrust devices are needed.

If you build or buy mill equipment, why not get all these advantages? Make sure the trade-mark "Timken" is stamped on every bearing used. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



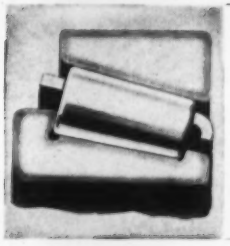
How these ingot car axles are mounted on Timken tapered roller bearings to insure long, trouble-free performance.



TIMKEN

TRADE MARK REG. U.S. PAT. OFF.

TAPERED ROLLER BEARINGS



GREATER LOAD AREA

Because the load is carried on the *line* of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.